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Principles of Machine Forging

Consideration of the Apparatus Used and the Limiting Conditions—How the Machinery Was Developed

BY HOLLOWAY KILBORN*

FORGING, the art of forming or shaping metal by heating and hammering, is as old as history. Tubal-Cain, the first well known artificer or "cunning worker in metals, is recorded in Genesis as "an instructor of every artificer in brass and iron."

Machine forging is that portion of the art in which the work is mainly done by machines instead of by hand as by a blacksmith or a hand forger. Machine forging is done in the main by four classes of machines: (1) Trip Hammers, (2) Drop Hammers, (3) Upsetters and (4) Presses.

Trip Hammers

A TRIP hammer is a power-driven sledge hammer which is suitably held or guided so that all blows strike in exactly the same place. Means also are provided so that the force of the successive blows may be regulated by the operator. A trip hammer is one logical result of man's desire to substitute the forces of nature for muscular effort.

The helve type of trip hammer (Fig. 1) consists of a base, on the top of which is an anvil holding a die on which the piece to be forged is laid. There is an arm or helve pivoted at one end, and on the lower side of the outer end is means for holding a second die, which strikes against the die held in the anvil.

The free end of the helve is vibrated by a cam or crank action, the speed of vibration being under control of the operator from a full stop up to a few hundred strokes a minute. The helve being cushioned at each end of its stroke by thick rubber pads, the force of the blow delivered is a function of the speed—the greater the speed, the harder the blow.

This machine is belt driven from above; when idle, the belt is sufficiently loose so that the machine does not run. A foot treadle is connected to an idler pulley so arranged that pressure on the treadle pushes the idler against the driving belt. This takes up the slack of the belt, causing sufficient friction between the belt and the machine pulley to drive the machine. Maximum speed is obtained by pressing hard enough so that all possible slip between the belt and the machine pulley is eliminated.

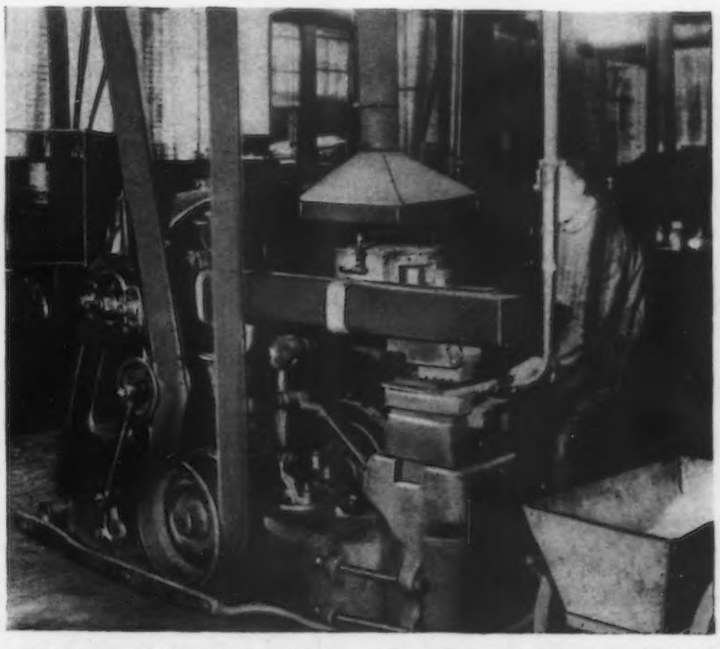


FIG. 1—Helve Type of Trip Hammer, with Force of Blow Controlled by the Speed of Operation. This view and that in Fig. 2 are from C. C. Bradley & Son, Syracuse, N. Y.

Another type of trip hammer is called the upright helve hammer (Fig. 2). This type has a ram interposed between the moving end of the helve and the upper die. The ram travels vertically and operates between side guides. It is loosely connected to the helve with a rubber cushion between and receives

*Treasurer, Kilborn & Bishop Co., New Haven, Conn. This is the first of three articles; the second will take up the question of forging dies; the third, that of the operation of the equipment in producing forgings. Mr. Kilborn contributed articles on "Forging" and "Drop Forging" in the new fourteenth edition of the Encyclopaedia Britannica.

the force of the blow from the helve and delivers it to the upper die, which is rigidly held to the lower end of the ram.

One of the advantages of this type is that the blow as delivered to the metal is a true vertical blow, rather than being on the arc of a circle of which the length of the helve is the radius.

Particular advantages of a trip hammer are the rapidity of its blows and the ability to change the force of the blow instantly from zero to the capacity of the machine.

Trip hammers are in general the smallest of the machines used for forging, their ratings varying from a few pounds up to several hundred and overlapping, in the upper range, the smaller size drop hammers. Trip hammers are generally used with the class of dies known as open dies, that is, dies with impressions so designed that the metal when being worked can flow out of the impression and beyond the edge of the die.

Typical examples of the type of forgings made by this process are cold chisels and other chisels of various types, drive and drift punches, picks, axes, hoes and, with properly shaped dies, the carpenters' twisted brace bits.

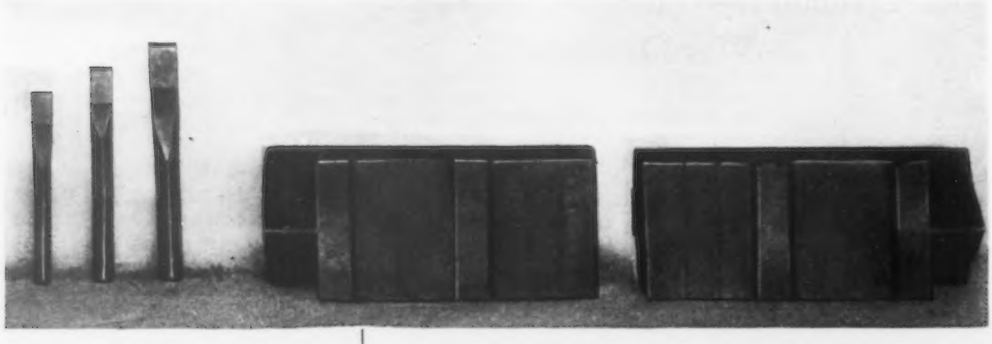


FIG. 3—Pair of Trip Hammer Dies Designed for Forging Three Sizes of Cold Chisels, as Shown at Left

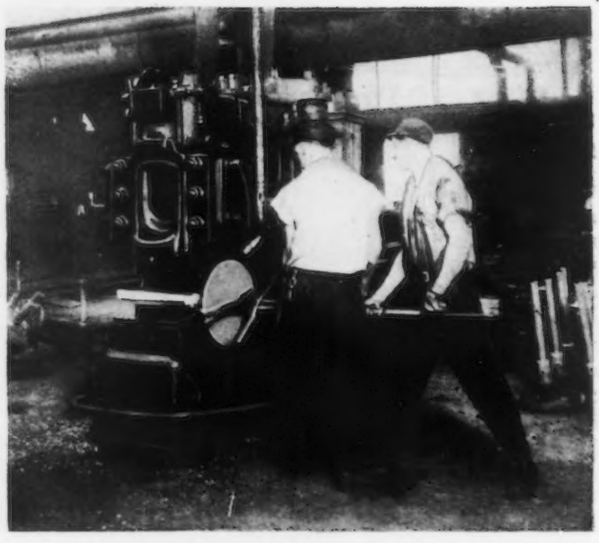


FIG. 2—Upright Type of Helve Hammer, Which Has a Ram Between the Helve and the Upper Die. The blow is truly vertical (at right)

How the Dies Are Used

Fig. 3 shows a typical pair of trip hammer dies used to forge cold chisels. This pair of dies is designed to forge three sizes of chisels. The broadest surface forges the tapered face of the chisel, this taper being the same for the three sizes, and the three steps at one end of the die are for different chisel widths. At the other end of the die is the cut-off.

The forger heats the end of a bar of steel and hammers it a few blows in the broad impression and then a few in the proper step for the width he is working on, and alternates in this manner until the chisel is formed. The tapered end is cut off square and then the butt end is roll-cut (light blows in the cut-off while rotating the bar). The bar is then returned to the furnace for further heating and the production of the next chisel.

Many Other Uses for Hammer

A hammer of this type is used also for welding and for a great variety of drawing operations incidental to the production of forgings by hand or by the drop hammer or upsetting methods.

There is no inherent reason why trip hammers cannot be used with closed dies, such as are mainly used in drop hammer work; that is, with dies in which the metal is forced and confined within the impression in the dies so that, after completely filling the impression, the metal will have some particular desired shape. Indeed, it is so used, but in general when such a result is desired the drop hammer with its slower but much heavier blows produces quicker results.

Drop Hammers

A DROP hammer consists of a cast steel base in the general form of a rectangle, weighing from a few hundred pounds up to several tons, depending on the size of hammer. Resting on the concrete base and at each side are the side guides or uprights, on the upper end of which is carried the head or mechanism for lifting the ram. The ram, the falling weight which produces the force of the blow, travels vertically, guided by the uprights.

The board drop hammer (Fig. 4) utilizes a board (generally of maple) as a means for lifting the ram. The lower end of the board is fastened to the upper portion of the ram. The upper end of the board travels between two rolls, belt driven by large pulleys on their ends, which revolve in opposite directions. Automatic mechanism is provided to vary the distance between the rolls, so that they alternately squeeze the board and, revolving, lift it, and then are spread apart, allowing it to fall.

The steam drop hammer (Fig. 5) utilizes a steam cylinder similar to that of a steam engine for the overhead lifting mechanism. The piston rod takes the place of the board and the ram is fastened to the lower end of the piston rod. The steam hammer may utilize steam pressure in addition to the force of gravity on the downward stroke, or it may utilize steam pressure against the force of gravity to reduce the force of the downward stroke. It thus has a wider range for a given weight of ram than a board hammer, in which the force of the blow can be varied only by the distance through which the ram is allowed to fall.

The rated size of a board hammer is the weight of the ram. The practical limit is generally about 2500 lb.

A steam hammer is rated according to the weight that it would be necessary for a free falling ram to have to give an equal blow. They vary in size from a few hundred pounds to several tons.

Air drop hammers are fundamentally the same as steam hammers, using compressed air instead of steam. They are generally equipped with an individual motor-driven air compressor. When only one or two drop hammers are needed, or when their use is infrequent, the air hammer does away with the necessity of a steam boiler and therefore with the delay in putting the hammer into operation.

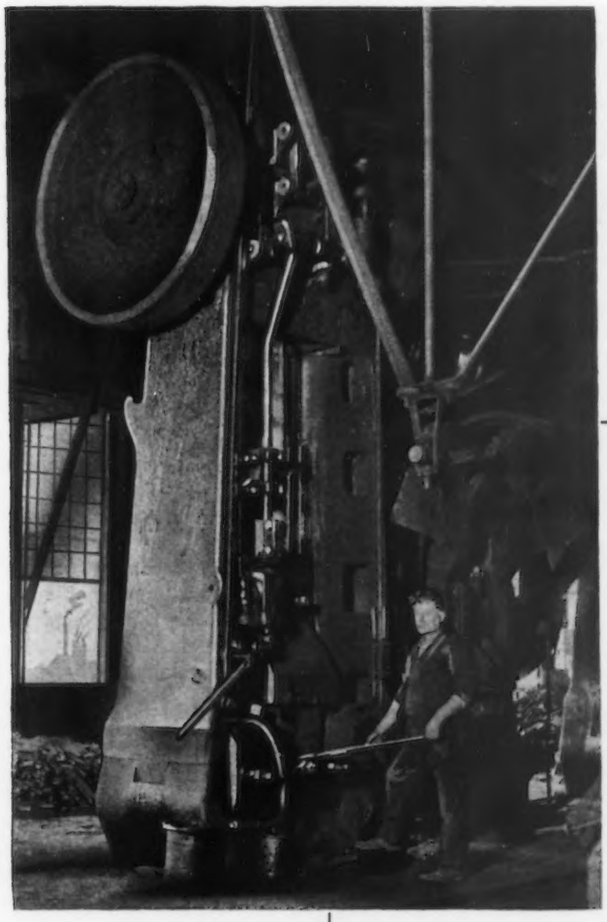


FIG. 4—Board Drop Hammer in Plant of Billings & Spencer Co., Hartford, Conn. The blow depends upon weight of the ram and the height from which it falls (at left)

FIG. 5—Steam-Operated Drop Hammer Made by Erie Foundry Co., Erie, Pa. The action of the steam cylinder may either augment or reduce the force of gravity acting on the ram (at right)

History of Drop Forging

SOMEWHERE between 1850 and 1860 the first drop forgings were made; some authorities place the time as early as 1853, while others put it as late as 1858. But there is general agreement that they were made by Samuel Colt of the Colt's Patent Firearms Co., Hartford, Conn.

In 1862 C. E. Billings, originally of Windsor, Vt., together with Amos G. West of Utica, N. Y., interested the Remington Arms Co. in the subject of drop forgings for pistol parts. That company leased a shop in Utica and equipped it for the production of forgings for pistol parts for use in the Civil War.

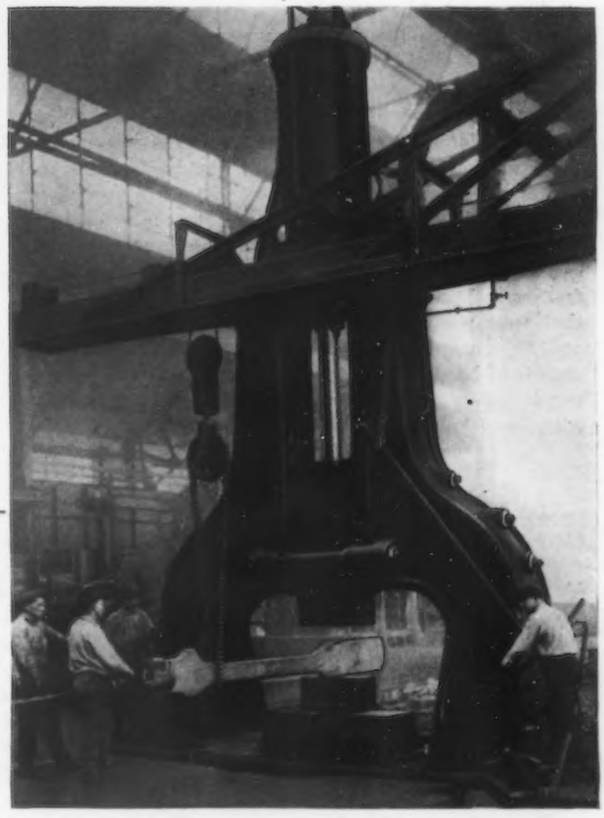
The earliest known type of drop hammer had an anvil equipped with four uprights and four rams. This construction was necessary on account of the slowness of the operation of lifting the rams, which was by means of a screw along the upright and a half nut on the ram, later replaced by a rack and pawl. Four pairs of dies were necessary, the operator walking around the machine, getting in succession one blow from each ram.

By 1869 there had been developed what is known as the crank or Peck lifter, which utilized as the lifting mechanism a rope or strap connected on its upper end to a revolving crank arm. The next was the Styles drop, which utilized a board and rolls, but the rolls were operated by gears. These later were done away with, resulting in the present style of roll drop, belt driven with flat pulleys.

Many Materials May Be Forged

It is possible to forge many different kinds of material, among them being iron, copper, certain of the brasses, bronze, aluminum, monel metal, nickel and a great number of alloys of these and similar metals. By far the greatest number of forgings are made from steel and its alloys. Typical examples are wrenches, pliers, chisels, hammers, parts of machines of all kinds and especially of automobiles, such as connecting rods, crankshafts, manifold flanges, clevis bolts, etc.

While arc welds are generally understood to be cast metal, the melting and solidifying have been done under such special conditions that weld metal has very different characteristics from a steel casting made by usual foundry practice.



This is the conclusion of a study on "The Micro Structure of Electric Arc Welds in Structural Steel," by H. L. Publow and F. L. Reynolds, Department of Chemistry, Michigan State College, East Lansing, Mich., and published as Bulletin No. 21, Michigan Engineering Experiment Station.

Characteristics of Auto-Body Sheets

Developments of Past Decade Have Resulted in Definite Standards for Various Grades—Properties Demanded for More Economical Automobile Manufacture

BY R. C. TODD*

ABOUT 10 years ago a group of automobile body builders met with a group of automobile steel sheet producers at the Chamber of Commerce in Detroit in an effort to create standards for surface and drawing requirements in automobile sheet grades. Samples of products from many mills in various grades and sizes were on display and studied. The meeting developed that the requirements of the users were varied and the production practices of the mills were different. As a result, the standardization of viewpoint desired became a generalization only.

This article is written in response to a request for a present-day generalization regarding automobile sheet grades. To arrive at a description of present standards, let us briefly review the developments.

Every five-year period since 1910 has shown a marked improvement in the quality of sheet steel produced for automobile purposes. This improvement in quality from a surface and workability standpoint has contributed a full share to the production economies in the automobile industry.

In 1910 the general sheet steel requirements for automobiles were for full pickled, three-pass, cold-rolled and annealed flat sheets. These sheets were required to flat form around wooden frames for the bodies and to bead and double seam for the fenders. By 1915 special grades of auto-body sheets were ordered, to make cold-pressed metal stampings. These stampings, after much bumping, grinding and hand hammering, were assembled to wooden frames. The paint and air drying process applying at that time was for about seven to 12 coats against the 15 and 20 coats practice of five years before. Also, special grades of hood and fender sheets were ordered to serve the requirements of three and four coats of dipped enameling, with hand rubbing between coats.

Developments Since 1920 Numerous

By 1920 cold-rolled strip mills had so widened their strip output as to give a new character of supply for crown fender work and to permit the fenders to be adaptable for two-coat dipped enameling without rubbing. By this time a better surface finish was obtainable on radiator casing grades, to permit nickel plating after grinding, whereas japan enameling for radiators had previously been the practice. Drawing properties had also been developed in auto-body sheets to the extent of reducing the degree of surface disturbance from the draws. This improvement eliminated much of the grinding and filing that previously had been necessary.

By 1925 a method of loose sheet rolling came into general use, which permitted the production of auto-body sheets practically equal to the standard of the hood and fender grades of former years. Also, all mills had greatly increased the extent of the range of drawing grades, and correspondingly the use of normalized sheets became greatly increased.

Since 1925 a new trend has developed toward using sheets as wide as 63 in., whereas prior to 1925 the maximum obtainable was about 48 in. in width. This trend permitted the automobile manufacturer to make larger but fewer stampings.

Dovetailing with the recent process of lacquer finishing bodies, the constantly improving art of steel making has permitted the production of finer automobiles at extremely low cost.

At present, wide automobile sheets can be produced by the revolutionary methods of continuous hot rolling and cold rolling, and the art of loose rolling and normalizing has reached the point where extraordinary standards of workability and surface are obtainable.

Constant Changes Make Definite Standard Difficult

The automobile companies in turn are demanding die work to permit finished stampings to come from their presses without scoring, scratches or low spots; to the point that even touching-up practices are taboo; and also to the point that the number of lacquer finishing coats to be applied can be reduced. These constant changes make it as difficult today to develop a definite standard for various automobile grades as it was 10 years ago.

The grades of full finished sheets as ordered today for automobile panel parts are auto-body steel, auto-body deep drawing, auto-body extra deep drawing, hood and fender steel, hood and fender deep drawing and hood and fender extra deep drawing. A general description of each grade, as at present understood, is herewith attempted.

Auto-Body Grade

THIS is a mild open-hearth sheet steel, full pickled, especially densified by polished cold rolling and tempered by annealing. It is produced in thickness 22 gage (0.0306 in.) to 16 gage (0.0613 in.). The surface of these sheets has a glossy, smooth, sleek appearance, generally with clear centers and dark borders. The sheets are inspected for a degree of flatness and for such freedom from surface imperfections as will make them suitable for small round formed flat areas, such as wind shield headers and door headers. This grade is adaptable for the normal practices of body lacquering and painting.

The temper is medium hard, but the sheets in 18-gage (0.0490 in.) and thinner have the adaptability to bend around wire. In 20-gage (0.0368 in.) and lighter they will withstand 180-deg. bends with and against the grain without fracturing. In 16-gage (0.0613 in.) to 18-gage (0.0490 in.) they will withstand 180-deg. bends against the grain without fracturing.

The grade is normally quite flat, being roller leveled and not stretcher leveled. Such sheets can be used for flat curved work, such as flat curved cowls or for truck hood tops and hood sides where the auto-body surface standard is acceptable.

*Assistant general manager of sales of American Rolling Mill Co., Middletown, Ohio.

In 22-gage this sheet is adaptable for bumping requirements, but it is not adaptable for bumping purposes in 20-gage and heavier.

Auto-Body Deep Drawing

THE steel of this grade is of mild carbon open-hearth analysis and is processed with full pickling, full cold rolling and full annealed treatments. It is produced in thicknesses 0.0306 in. to 0.0766 in., inclusive.

This grade varies according to the type of mill by which it is produced and the purpose it is to serve. It varies from a uniformly dark, nappy surface to that of a clear, highly-polished surface.

This character of sheet is generally the softest tempered auto-body grade that can be produced and therefore, where surface disturbance is not a factor, it is adaptable for hand forming, roll forming, beading, bumping, interior and exterior flanging, and for shallow shell draws.

As the temper of this grade is medium soft, the sheets are generally not so flat as can be produced in the other automobile grades. Sheets of this quality will stand double seaming with and against the grain in thicknesses from 0.0306 in. to 0.0613 in., inclusive.

Auto-Body Extra Deep Drawing

THE processes in use for the manufacture of auto-body extra deep drawing sheets are many and varied. A generalization is that this grade is of open-hearth steel with low carbon analysis and is processed by full pickling, special cold rolling and special annealing treatments to make the grade suitable for drawing requirements that carry with them extra hazards.

Auto-body extra deep drawing material carries with it the producer's guarantee that the sheet will draw into the automobile body panel part for which purchased, with a breakage within the standard tolerances established, and that the surface will remain undisturbed, suitable for the standard practice of lacquer finishing or painting, provided the user assists in overcoming the variables of temper, temperature, aging, etc., by processes such as roller leveling just prior to the drawing operations.

The specification of auto-body extra deep drawing imposes on the producer the necessity of determining the character of the part and the method by which it will be drawn and finished, and, after a due opportunity of trial runs, of producing a grade suitable to the buyer's process.

There is therefore no single grade standard for auto-body extra deep drawing material, but under this caption sheets must be produced in analysis, grain structure, temper and finish to meet specifically the individual hazards of parts made by direct draws, compression draws or compound draws, and to vary in adaptability for Artz press, hydraulic press or power press work.

Material in this grade can generally be produced with a degree of surface sheen and smoothness superior to the auto-body and auto-body deep drawing grades, owing to the fact that it undergoes more treatment and is more critically inspected.

Hood and Fender Grade

UNDER this specification, flat formed running board aprons, hood tops and hood sides can be supplied. Sheets in this grade are adaptable for hood tops in sheet widths of 34 in. and narrower where the length of the hood does not exceed 34 in. Sheets wider than 34 in., for hood tops longer than 34 in., require a stretcher leveling treatment to make this grade satisfactorily flat for such purposes.

The hood and fender grade is adaptable also for running board aprons where the length of the running board is within 80 in. When the sheet is required for a running board beyond 80 in. long, stretcher leveling treatment is required to permit the material to be satisfactorily flat.

The hood and fender grade is produced in thicknesses 0.0306 in. to 0.0613 in. Sheets in 0.0306 in. by 34 in. and narrower and in 0.0368 in. and heavier in widths 36 in. and narrower can regularly be produced to meet a high standard of two-coat dipped enameling process.

In workability this sheet, while very hard, will bend around wire, in 0.0368 in. and lighter, and in these thicknesses will hand form flat upon itself both with and against the grain without fracture.

A higher surface inspection standard is applied upon this grade for flatness and for freedom from roll corrugations, chatter and other surface defects than is applied to any of the auto-body grades.

This grade is not adaptable for any drawing requirement, although it will meet the normal needs of beading, round forming and double seaming. Where the louvers in hood sides require a distinct drawing operation, a hood and fender deep drawing grade is necessary.

Hood and Fender Deep Drawing

THIS specification generally covers about as versatile a quality of material as can be produced in any grade. The surface standard here is very high, permitting the sheet in 22-gage up to 32 in. wide and in 20-gage and heavier up to 36 in. wide to be adaptable for two-coat dipped enameling. In widths over 32 in. to 36 in. in 22-gage and in widths over 36 in. to 42 in. in 20-gage and heavier, the standard of surface can be made adaptable for three coats of dipped enameling.

Along with this high standard of surface in this grade is coupled a temper that is medium soft, which permits the material to be used for roll-formed crown fenders, wire beaded and formed radiator aprons, heavy flanged instrument boards and lamp doors, heavily louvred hood sides, hood ledges, etc.

With roller leveling treatment before drawing, this sheet is adaptable for most auto-body doors, as it comprises the flatness desired and high surface finish needed and the soft temper for the window openings and the door flanges.

It is a good sheet for many forms of compound draws and shallow shell draws where roller leveling treatment is regularly applied to minimize the development of stretcher straining.

This grade is produced in 22-gage (0.0306 in.) to 14-gage (0.0766 in.).

Hood and Fender Extra Deep Drawing

THIS specification covers qualities of sheets produced in many ways with all the varied tempers as mentioned under the description of auto-body extra deep drawing.

The material is full pickled, full cold rolled and full annealed. The surface and drawing qualities are the finest that can be supplied for direct drawing operations.

This grade is guaranteed to draw for the above mentioned requirements within established breakage tolerances, with the surface remaining relatively free from superficial disturbance, provided the assistance of roller leveling is utilized, which the variables of temperature, temper and aging justify.

Radiator Casing Steel

THIS sheet is especially designed for the extremely difficult requirements of manufacturing automobile radiator casings and it is the only grade that is recommended for such purposes. It has a hard temper, but is specially tough. As a polished cold-rolled sheet, this grade has no superior for severe shell-drawing requirements. It has a bright, light color and a highly polished surface, which is rendered free from adhering oxide scale by a process of deoxidizing after annealing.

Radiator casing steel is produced in gages 0.0368 in. to 0.0613 in., inclusive. It is treated to develop maximum

shell-drawing qualities in a polished cold-rolled sheet and to minimize tendencies to stretcher strain, coarsen or crystallize during drawing operations.

Under the application of grinding and polishing this sheet is adaptable for nickel plating.

Those who have had long experience in the use of sheets for automobile purposes are familiar with the special attributes in these various grades of sheets as produced by various mills. This generalization is offered therefore for such interest as it may be to those who are newer to the problems pertaining to sheet steel specifications for automobile parts manufacture.

The quality progress in the art of automobile sheet steel manufacture and the advance in production efficiency over the last 20 years have been great, and so have the hazards grown. With the ever-pressing demand of the automobile industry for more economies, it is difficult to conjecture what the results in another five years will be.

Over 2,300,000 Automobiles Scrapped Last Year

TWO or three years ago it was common to assume that about 2,000,000 automobiles of the production each year were destined for replacement purposes, and that the remainder might be considered additions to the total number in service. This was equivalent to estimating a scrapping program of about 2,000,000 cars a year.

Figures compiled recently by *Automotive Industries* show that at present this scrapping of used cars is proceeding at a considerably higher rate. The estimate for 1927 is 2,367,000; that for 1928, which is not yet completely established, may run 2,750,000. These figures replace the average of approximately 1,580,000 for 1924, 1925 and 1926. As recently as 1923 the total was less than 1,000,000. (All figures are for passenger cars.)

It happens that no records are kept of the scrapping of automobiles. Thousands of them are bought by junk dealers and converted into marketable scrap products. Thousands of them are run into dumps and left at the mercy of the elements. The geographic distribution of the cars scrapped must bear a close relationship to the geographic distribution of the cars in use. In other words, they are scattered all over the country in large and small communities, roughly in proportion to population.

Calculations of the number of cars scrapped in any one year are made by *Automotive Industries* by considering several ascertainable statistical facts. The car registrations of all States combined, at the end of each year, the production of cars during the year, the exports and the imports, all are taken into consideration.

The difference between total registrations of two successive years represents the gross gain in cars in use. The difference between production of a year and the net exports (exports minus imports) represents the number of new cars passed into service during the year.* The difference between the cars passed into service and those representing the gain in registration will be the number scrapped.

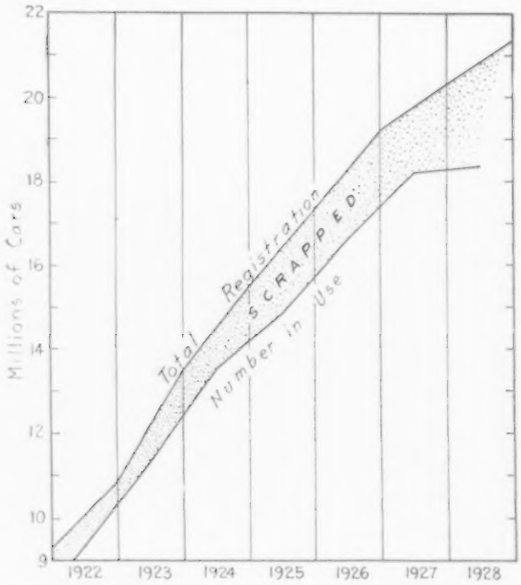
There is some difference of opinion as to whether this number should be allocated to the scrapping of the earlier year or of the later year. Practically speaking, it probably is divided between the two years. For statistical purposes it must be assigned to the earlier year, which explains the fact that we have no definite figure yet for cars scrapped in 1928.

From the end of 1922 to the end of 1928 the number of car registrations in the United States practically doubled. The increase was from 10,864,000 to 21,317,000. During this six-year interval total production of cars in the country was 21,343,000. Net exports aggregated about 1,959,000 cars. The remainder, 19,384,000 cars, or nearly double the number in service at the end of 1922 was passed into service. Inasmuch as the gain in registration in the six years was only 10,453,000 cars, it follows that 8,931,000 cars must have been abandoned or sold for scrap. The diagrams and the table show the history of the changes which have taken place as outlined above.

In making such calculations, certain careful studies have had to be made of the figures for exports and other particulars. Inasmuch as the production figures include the cars made in parts and shipped in parts to foreign plants for assembly, the export figures must necessarily include these shipments. As these are customarily reported separately from the exports of completed cars, they frequently are ignored in making such studies.

One interesting feature of the growth as shown in the table lies in the fact that the number of cars scrapped in 1927, compared with the number of cars left for domestic consumption, shows a net gain of less than 250,000 cars for the year. Compared with this the net gain of the preceding year was almost 1,600,000. There was, of course, no such great difference between the two years. This lends point at once to the belief that the cars scrapped, as shown by these calculations, are necessarily distributed between the two successive years, instead of being applied wholly to either one of those years.

*A difference in stocks in dealers' hands, between the two periods, would affect this, but not to any serious degree.



With Largely Increased Use of Automobiles, the Number Scrapped from Year to Year Is Growing at a Rapid Rate

Automobiles Scrapped Year by Year

(Thousands of Passenger Cars)

	1922	1923	1924	1925	1926	1927	1928
Cars registered (a)	9,346	10,864	13,480	15,461	17,317	19,208	20,282
Domestic consumption (b)	2,237	3,456	2,972	3,430	3,514	2,610	3,402
Total available	11,583	14,320	16,452	18,891	20,831	21,818	23,684
Registered, Dec. 31	10,864	13,480	15,461	17,317	19,208	20,282	21,317
Scrapped (c)	719	840	991	1,574	1,623	1,536	2,367
In use, average	9,386	11,332	13,480	14,815	16,639	18,209	18,433

(a) End of preceding year.
(b) Production, less net exports.
(c) For reasons explained in the text, most of this loss by scrapping was incurred in the preceding calendar year.

Simulated Road Shocks in Testing

Chrysler Engineering Department* Uses Machine to Duplicate Execrable Road Condition—Cold Room for Below-Zero Tests

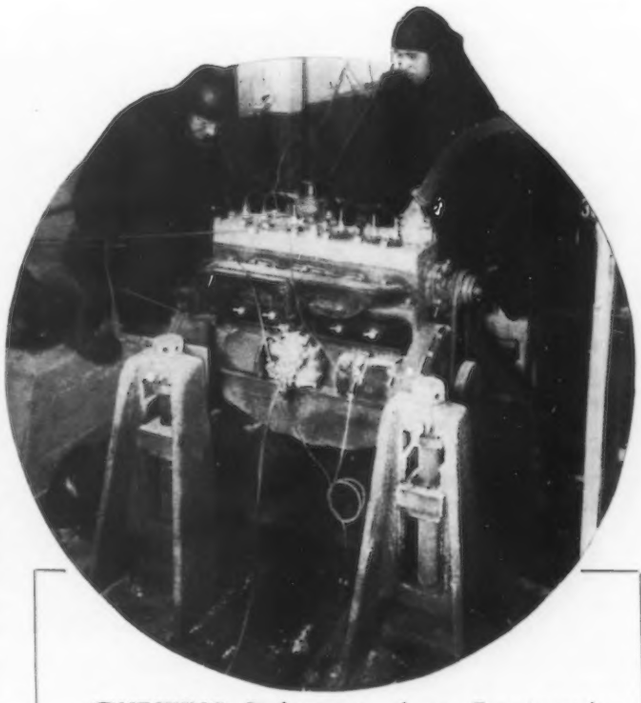
BY C. A. MC GRODER

THROUGHOUT the building are numerous small rooms and sections, usually parts of the major departments, each devoted to some special test and each contributing its share to the precision and certitude of the results produced by the engineering division. There is a rubber-testing section where rubber mats, engine mountings and spring mountings and other rubber parts are tested with the aid of a Scott tensile testing machine, a Shore durometer and a Firestone penetrometer. To be adopted for use, insulating rubber must show a minimum tensile strength of 3200 lb.

There is a cold room where complete experimental cars and engines or other units are tested at various temperatures, to learn how to obviate cold weather starting and lubrication difficulties. This room is equipped with a dynamometer which allows a car being tested to be driven at any combination of speed and load. Temperatures as low as 60 deg. below zero can be produced, and a temperature of 20 deg. below zero can be maintained indefinitely. Communication between workers inside and outside the room is made possible by the use of transmitters and amplifying equipment.

Among the other sub-laboratory sections is the space devoted to a Cooper-Hewitt ultra-violet-ray lamp, on which accelerated weathering tests are made on top materials, trimming and various other colored fabrics in which exposure to sunlight is a factor in deterioration.

*Testing of materials and car parts described on page 876, of THE IRON AGE, of March 28.



CHECKING Performance of an Experimental Motor Assembly in the Cold Room, with Temperature 10 Deg. Below Zero, Fahr. Arctic clothing is furnished to the engineers, who work in the room in relays

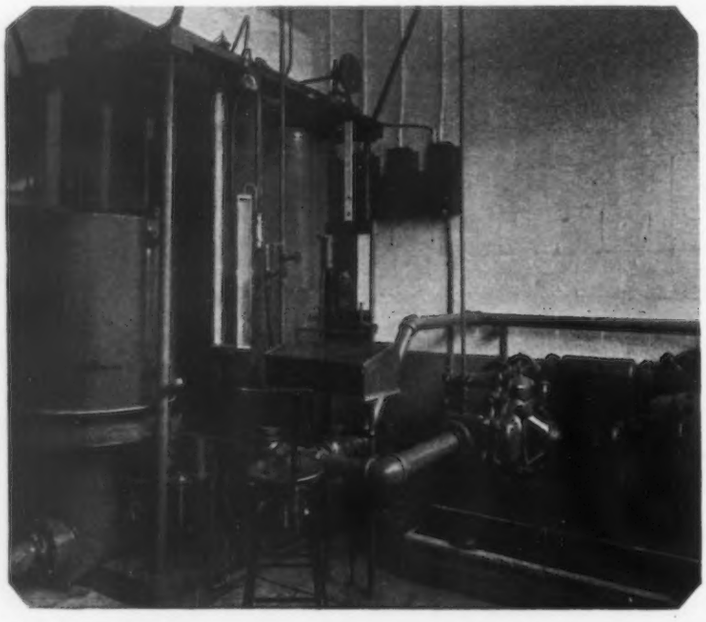
There is also a fuel room equipped with the most modern devices for testing motor oils, fuels and greases. Here again specimens from incoming shipments are examined before the cars are unloaded, to make sure that specifications have been complied with. Horns are tested in a sound-proof room where automatic commutators control their intermittent operation over long, predetermined periods.

The power plant laboratory, which occupies a large part of the ground floor, is equipped with three 50-hp. and four 150-hp. dynamometers, and many other machines and devices with which to test manifolding, carburetion, lubrication and other characteristics of engine performance.

ROAD Shock Test Machine, on Which Experimental Cars Are Subjected to Terrific Punishment and Enormous Mileage Within a Few Hours. Automatic recording devices indicate important performance details. Metal cleats, running vertically across the face of eight rollers, toss and bump the car around

Torque is weighed on suitable scales and the r.p.m. measured with a tachometer, to check the power developed in the engine being tested. The chief function of the power plant laboratory is to make certain changes in the structure of the engine or its accessories, and then to observe and record the resulting variations in power and performance. A distinctive feature of this department is that all of the machines and devices in the room are laid out so that they can be operated conveniently by one man.

One of these devices deserving special attention is the air-flow test machine, designed and built by Chrysler engineers. This consists of a sheet steel tank and gasometer of 50 cu. ft. capacity, coupled through tubing to a hood, the lowering of which into a water seal causes the air to be drawn from the gasometer. The carburetor or manifold or other part being tested is attached to a fitting which passes through the base of the hood to a Nash vacuum pump—the source of suction. Since an engine's power is determined by the amount of air it uses, rather than by the amount of gasoline consumed, the measurement of the air used is the measurement of the amount of power available.



FLOW Test Device—Tank and Gasometer of 50 Cu. Ft. Capacity, Coupled Through Piping to a Hood, the Lowering of Which Into a Water Seal Causes the Air to Be Drawn from the Gasometer. Measurement of air used shows engine power available. Used principally for testing carburetors, this machine can also determine which of two valve shapes is best and can determine manifold and carburetor choke sizes

Measurements on the air-flow test machine are taken by the use of a split-second stop watch which registers to 0.01 second. It has been found that 20 cu. ft. of air a minute corrosponds roughly with 20 miles an hour on the average passenger car, while a speed of 80 miles an hour requires 200 cu. ft. of air a minute. In addition to the results accomplished on carburetors and manifolds, this test has been successfully applied in determining which of two valve shapes is best, the difference in the flow capacity of valves with different seat angles and the difference in flow capacity of different combustion chambers.

After all of the materials, parts and accessories have undergone the various tests outlined here and many others, duplicates of the approved units enter into the assembly department on the third floor, where they are incorporated into the complete experimental car, which is delivered on completion to the ground floor for final performance tests.

Here is located the road test department, which conducts final tests on all experimental cars, parts and accessories. Description of the many laboratory tests now being conducted on experimental cars and parts may give an impression that the road test has fallen into disuse. Nothing could be further from the truth. The importance of the road test could not well be overestimated. In spite of the scientifically exact results obtained on the many testing devices in use in the engineering division, the road test department is still the final arbiter as to the fitness of experimental cars or parts to be put into production and marketed.

Every experimental car delivered to the road test department is turned over to two test drivers, who take it out on the road and drive it the prescribed number of miles in alternate shifts, writing a performance report at the end of each shift. But mileage alone is not the sole object of these test trips. Drivers are instructed to seek out a variety of roads and to note the variation in performance under the varied road conditions. Other drivers are kept busy driving standard test cars upon which experimental parts are tested. Several experimental units may be placed upon one test car and tested simultaneously.

If a new type radiator is to be tried out, or if an experimental motor is to be tested in which some radical departure has been made from previous water jacket design, the test car, equipped with the experimental part, is driven to Arizona for a 30,000-mile continuous road test that will determine the effectiveness of the new radiation system. Other test cars will be driven in southern Florida to test various experimental parts in which driving in high temperatures might be a possible cause of failure. Hill climbing tests on experimental motors, transmissions, rear ends and drive shafts are conducted in the mountains of Pennsylvania.

Another important function of the road test department is the continuous check made on production cars. There are always a number of these cars, picked at random from the end of the final assembly line, undergoing road tests as an assurance that all materials and parts are being kept up to the original specifications. Reports of the performance of these cars are forwarded daily to the engineering division, affording a continuous check on the quality of performance being rendered on current models. The road test department has its own record division, where all these data, and the other information reported by the road test drivers, are kept on file, readily accessible to the other units of the engineering division and to production departments.

To supplement the work of the road test department and to obtain certain information not always available from road tests, Chrysler engineers have designed and built the road shock test machine—a sort of indoor, stationary, accelerated and intensified road test. Its particular usefulness is to determine, in the shortest possible time, whether experimental cars are built of materials and equipped with parts which will not break under the worst road conditions.

The road shock test machine is an adaptation of a floor dynamometer, with eight rolls, two under each wheel of the car. Metal cleats attached across the face of each roll, at irregular intervals, simulate the conditions of very rough roads. Cleats are not allowed to synchronize. The car to be tested is run on to these rolls and is securely fastened by long turnbuckles to eyebolts in the floor. When the motor is started the speed it attains is controlled and varied by an automatic device which al-

ternately opens and closes the throttle. Power supplied by the rear wheels is transmitted by belts to the front wheels. The result is that the car is given a variety of shocks and vibrations that it could never be given on American roads.

Failures on Bad Roads Led to Machine

The building of this testing machine had its inception in reports emanating from Europe to the effect that American cars, Chryslers included, were showing failures of certain parts which were never causes of trouble on cars used in this country. Investigation revealed that the roads in Europe, particularly in France and Belgium, had been terribly abused during the war and were still in a very bad state of repair. The road shock test was devised to duplicate the bad action of European roads in wracking and pounding an experimental car with more severe vibrations than it would ever encounter on American roads.

One of the first cars tested on the road shock machine shook off a front lamp after being bumped on the cleated rolls only a few hours. In consequence a much heavier bracket was provided for the front lamps on that model and the brackets were attached to a more rigid section of the chassis. Since then many other improvements have been effected, to increase materially the life of certain parts in which failure was disclosed by the road shock test machine.

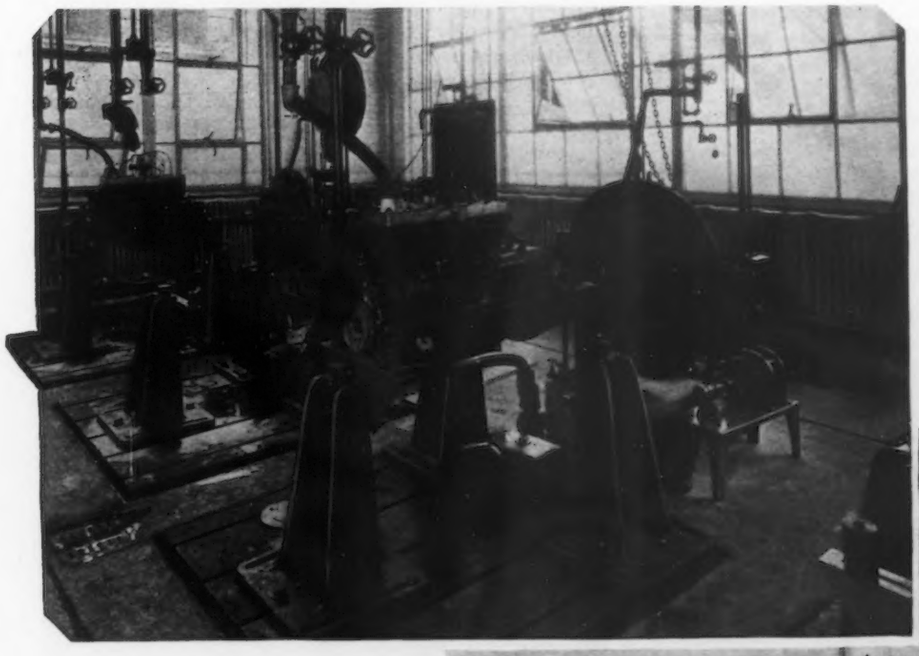
When an experimental car has been built up of materials, parts and accessories which have survived the exacting tests of the various laboratories in the engineering building, has gone through the ordeal administered by the road shock test and has been approved in the reports of the road test department, it is established as a regular member of the Chrysler line. Orders then are issued for the manufacture of its component parts on a production basis and the engineering division has completed its work on that particular model.

Tests Riveted and Welded Splices in 4-Ft. Web

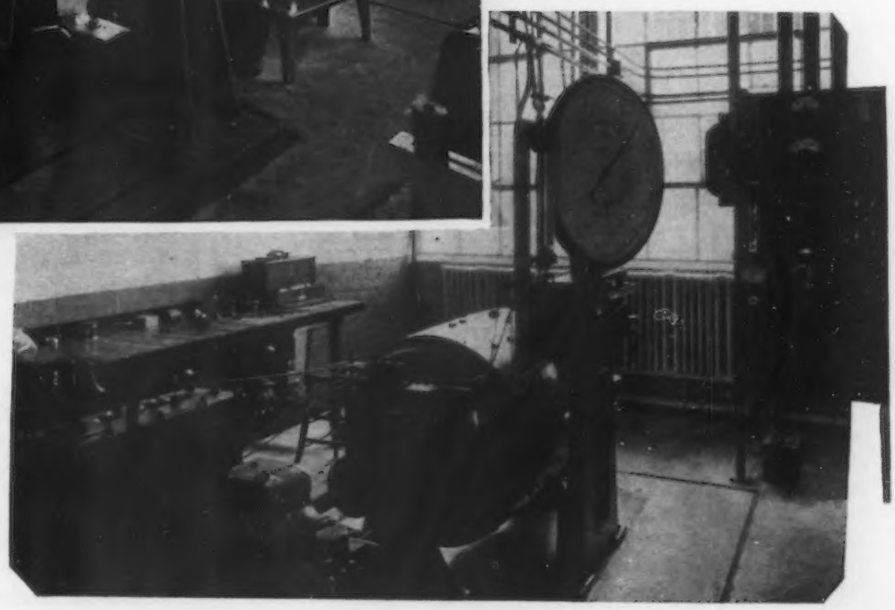
FULL-SIZED tests are being made on various members and joints entering into the Hudson River suspension bridge, in order to prove that they will safely carry the loads intended. One such detail is a heavy column joint between "silicon steel" plates 46 in. wide by ⅝ in. thick. Tested in tension, the strongest fail by shearing a line of rivets at a total load of 950,000 lb.

According to *Engineering News-Record*, the American Bridge Co. rebuilt two of these joints, replacing the critical rivet line by fillet beads 7/16 x ½ in. along the edge of angle legs on either side of the plate. This weld was deposited in two layers, the first using 5/32-in. electrode and 175 amp. and the second 3/16-in. electrode and 205 amp. On retest the failure was in shear through the weld, at the following figures:

	Test A	Test B
Effective length of weld....	92 in.	92 in.
Average width of broken weld	0.453 in.	0.416 in.
Breaking load.....	1,100,000 lb.	1,075,000 lb.
Stress per linear inch weld..	11,950 lb.	11,680 lb.
Stress per sq. in. weld.....	26,380 lb.	28,090 lb.



HYDRAULIC Dynamometer Room in the Power - Plant Laboratory, Where Complete Destruction Tests and Extensive Research Work Are Conducted on Engines. Gas and oil consumption and endurance of power plant parts are given particular attention here



DYNAMOMETER Room Where Chrysler Marine and Automobile Engines Are Studied, Developed and Improved. Recording devices furnish accurate and adequate data, and tests may be repeated as often as needed

Europe Buying More Machine Tools

Market for American Products Is Expanding, but Low Competitive Prices and Excessive Credit Demands Impede Expansion of Sales

WITH exports of American goods steadily rising and with markets abroad tempting American manufacturers into new selling fields, it is not surprising that interest in foreign trade is growing. This interest has been intensified by the inauguration of President Hoover, who possesses an intimate knowledge of world economic and industrial conditions and who avowedly will encourage expansion of American exports.

Unfortunately machine tools are not included in the group of American commodities that have made substantial strides in foreign sales in recent years. Especially in Europe has the demand for American machine tools been far below the pre-war level.

However, there was some slight improvement in 1928, and many machine tool builders are now trying to obtain an accurate appraisal of the present and future European market for their products. What kind of competition must be expected from European manufacturers? Is there a real market in Europe today for American single-purpose tools? These and many other questions are being asked.

In an endeavor to throw some light on these matters, a representative of THE IRON AGE interviewed Robert S. Alter, vice-president and foreign manager American Tool Works Co., Cincinnati, who spent eight months of the past year in the machine tool markets of Europe. The questions asked Mr. Alter and his answers are published below.

"What is the present condition of the machine tool industry in European countries?"

"As a general rule, the situation is not good. There is little profit in the machine tool business for either manufacturer or dealer, because of the low prices at which tools are being sold and because, in many cases, the amount of credit that must be granted the user takes away the opportunity for making money on the transaction and removes all incentive for accepting the business. However, there is a fairly good market for machine tools in Germany, France, Italy, Switzerland, Czechoslovakia and Russia, and in some industries in Poland. Demand is increasing in Sweden and England, and prospects have improved recently in Belgium, Holland and Spain. For a number of years, however, the European market for machine tools, except those of a highly productive nature, was so small that I did not consider it profitable to go abroad until 1928."

"Is the European market as glutted with used tools as it was a few years ago?"

"No. Machines that were capable of being put into service again were bought at ridiculously low prices by certain European dealers, who sold them to users, often at a handsome profit. However, there are several dealers, particularly in Germany, who still have large stocks of fairly good used machine tools and who specialize in this line. One of our American dealers in used machine tools, who is located in New York and who has substantial foreign connections, states that he is doing a satisfactory business.

"American used machine tools generally do not require as much rebuilding as those of foreign manufacture. This is due to the fact that the American tools have stood up better under usage than the foreign, because the latter are usually constructed of inferior material."

"Are present conditions favorable for American builders to expand their sales to European countries?"

"Yes, because until recently conditions could not have been worse. While the export of American machine tools is increasing, we are constantly encountering more severe competition on the part of European manufacturers, first, because their prices for a fairly good machine are so much lower than ours and, second, because they are getting under way a program of improved designs.

"So far as the betterment of designs is concerned, they are being pressed in that direction by their trade associations, which are urging them to design and build machines on a basis comparable with American high quality and high production, even if prices must be increased proportionately."

"So far as you can see ahead, do you subscribe to the common belief that the foreign market for American builders is permanently notched below the pre-war level? Can American builders expect to raise their percentage of foreign sales much above the present average?"

"The first of the two questions can be very misleading, because of the difference in the prices that prevailed before the war and those now in effect. For example, the 'American' 14-in. x 6-ft. single back-geared, cone pulley lathe regularly sold before the war for $387; the same size machine, greatly improved, is being sold today for $996. The discount, however, remains the same. Therefore, it is better to confine discussion to the number of machines rather than to the monetary value.

"Barring new war developments, I believe that the number of machines of the usual standard type sold abroad will not exceed the pre-war total, or even equal it, except in certain countries which are becoming industrialized and which will require complete general shop equipment.

"Business in special machines of the single-purpose class probably will continue to increase, provided that general conditions also continue to improve. At the time of my visit many automobile plants had installed American super-production machines, which were entirely too productive for the demands of the market. The result was that many were standing idle, or were being operated part time. It was only natural, under the circumstances, for sentiment against super-production machines to de-

velop, and many buyers are considering more carefully the types of machines which they will need for further expansion."

"From a credit standpoint, are European buyers asking for concessions which the average American buyer does not expect?"

"They certainly are. There are many customers who are more interested in the amount of credit to be extended than in the productive capacity and price of the machines they want to buy. The shop man who has to select equipment to turn out a certain quota of work usually decides on fairly satisfactory equipment. But his battle is to sell the financial department of his company on the equipment he desires, and this sometimes takes from 3 to 12 months. When the decision to buy finally has been made, the financial department probably wants to be carried along for a corresponding period.

"Thus, the American machine tool dealer or builder first must battle to sell his product to the shop executive and then must also sell the financial department of the customer a satisfactory credit plan. Perhaps in the interim prices have been raised. At this juncture along comes a domestic manufacturer who is willing to install his machines on trial for six months, and this offer is difficult to refuse. Naturally the European manufacturer feels reasonably sure that his machines will be retained after they have been used in the customer's shop, mounted on concrete foundations and fitted with the necessary fixtures for doing the required work.

"When a European buyer decides to purchase American machine tools he usually is convinced that he cannot get much credit, unless he obtains it from the dealer, and he proceeds on that assumption. I doubt if many American companies are doing much business in Europe on a long credit basis, although some credit accommodation is necessary. In ordering machine tools from American manufacturers, German dealers are handicapped by lack of financial assistance from German banks, such as was given them before the war. At that time the dealer who received an order could turn it in to his bank and secure the cash with which to discount the bill for the equipment in New York. Now, however, the dealer must finance himself. Here is another reason why the Germans and others are calling for credit accommodations, thus throwing more difficulties in the way of the American machine tool builder who is trying to get business abroad.

"In German export trade the Government, through its national banks, assists German manufacturers financially by giving them substantial credits to enable them to put into effect the system used before the war in their relations with foreign customers, something which, to my knowledge, has never been done by the United States Government. As a contrast, I know of American banks which worked against the home manufacturer in financing certain foreign railroad developments, claiming that European machinery should be installed because it was cheaper than the American."

"How are European builders marketing their tools?"

"As in this country, there are two systems, through established dealers and direct to the customer. There are times when the European manufacturer who sells through dealers goes over a dealer's head and sells direct, and in such cases the dealer does not always get his commission. Some European dealers are not very active and confine their efforts to their immediate vicinities; others, however, broaden out and have large sales organizations. In several important instances, dealers maintain departments equivalent to those of the best American machine tool builders. They design and make jigs and fixtures for their customers and make production guarantees. This is in sharp contrast with the American system, under which the manufacturer is expected to render all of this service as an aid to the dealer. Salesmen for high-grade European dealers usually are capable of giving production estimates right in the customer's shop and are themselves practical operators and demonstrators of the tools they are selling. No doubt this service on the part of the dealers has been developed to meet competition from American efficiency engineers maintained in the field by some American builders to assist their sales organization.

"Reciprocity, of course, controls a great deal of business, and one of the strongest factors in the European market is nationalism, which is used by the foreign manufacturer as an appeal to the customer to patronize domestic industries and thereby keep money at home instead of letting it go to 'rich America.'"

"How do the prices of European-made machine tools compare with ours?"

"They are usually much lower, even for fairly good machines. The average prices are probably 30 to 50 per cent under ours, depending upon the class of machines. Lathes are cheap as compared with American. High-quality radial drills are closer to the American price, but there are many cheap radials. This applies also to shapers, which are cheap in price, but of very inferior quality. In fact, there is not a shaper on the European market that can compare in quality with American shapers. But shapers are beginning to be used in Europe as production machines, and no doubt improvement in quality of the European product will come later. Milling machine prices are lower than ours, but there are exceptions to his rule. A large British manufacturer is placing high-priced mill-

FOR many years Robert S. Alter, vice-president and foreign manager, American Tool Works Co., Cincinnati, has been a close observer of European machine tool conditions. He was abroad from March to November, 1928, on a business trip for his company and during that period visited the British Isles, Belgium, Holland, France, Germany, Czechoslovakia, Austria, Hungary, Poland, Finland, Norway, Sweden, Denmark and Russia. His extensive stay gave him opportunity to study at first hand the machine tool markets of European countries.

ers on the market and is doing considerable business. This house has done the same thing with turret lathes.

"British radial drills are priced at about the same level as the German, but are much lower than the American. However, I do not believe that they are worth any more than the price at which they are sold, although their sales are large, especially at home and in certain countries and colonies. I have found that most users are much interested in the purchase of American tools but, except in rare cases, are influenced mainly by price. Since the demand for high production abroad is not so pressing as in this country, the selling problem of the American builder is much more difficult than that of the European.

"Furthermore, foreign machine tool manufacturers do not seem to be afraid to use cast iron, and the foreign built machine usually has a more rugged general appearance than ours. This applies also to diameter of spindles, shafts, and feed or lead screws, and makes an impression on the buyer. I know of one 6-ft. radial drill that has an enormous column and arm as compared with the American machine of the same size. However, this machine is not capable of transmitting more than 10 hp., which makes it the equivalent, in productive capacity, to a high-grade 3-ft. American radial drill. If a 25-hp. motor were put on this 6-ft. machine, as it is on an American, an extra man would be required to sweep up the gear teeth scattered about, and the frictions would go up in smoke. I am of the opinion that when the Europeans have improved the quality of their machines with large hardened steel gears, anti-friction bearings and multiple-splined shafts, their costs will increase so materially that prices must come up closer to ours."

"Is there as much imitation of American design as there was a year or two ago?"

"There is a certain amount of imitation, but it is usually confined to models that are rapidly becoming obsolete, if not already so. Consequently, this type of competition is more or less beneficial, as few people are interested in buying a copy of an obsolete machine. American sales managers and their assistants in Europe are effectively driving this point home. I know of one automobile company that made a practice of copying American machine tools, but eventually decided that this was bad policy, because too much time was wasted in view of the fact that the plant was not jigged up to reproduce the American quality. The practice was not abandoned, however, until after it had been in force for many years. No doubt as European prices increase there will be less inclination on the part of European builders to copy American designs. They are finding out that a first class machine cannot be designed, built and sold at a price much lower than the American product."

"Are Europeans building many single-purpose tools or are they confining their work to standard-type machines?"

"While single-purpose tools are being built in Europe, they are made only on special order, because the demand is not sufficient to warrant a large production program under present conditions. Furthermore, some American builders, who have single-purpose machines covered with patents, have protected their patent rights in the European market. They are given fair treatment by the courts over there, who order those copying their machines to cease the practice. This action indicates that the European countries will give protection where patent rights are obtained.

"Crankshaft turning machines, high-speed sensitive drills and electric hand drills are examples of single-purpose tools which enjoy a good market, but these machines are offered at ridiculously low prices compared with American machines."

"How do European machine tool plants compare in size and in efficiency with American plants?"

"This is a broad question. There are, of course, many large, attractive machine tool plants, as well as exceedingly small ones of the worst possible type. I well remember being sent by a prominent French dealer in American machine tools to see a certain lathe manufacturer in Paris. This builder's product was pictured as being a worthy competitor of the best lathes made in the United States, and was selling at one-third of the American price. The plant was in a dilapidated condition, the crudest methods of manufacture were employed, and the workmanship was decidedly inferior. Yet this is the kind of company that is getting a large share of the French lathe business in competition with American lathes. Evidently the company was making money, and consequently one might say that the management was efficient.

"The company had in process on its drawing board the design of a LeBlond geared-head lathe, which it was trying to improve. Incidentally, the 'improvements' probably will be of benefit to LeBlond, as some of the good LeBlond features were being spoiled. However, the company probably will get many orders for this lathe and, since there was little engineering expense in copying the LeBlond design, no doubt will sell the machine at a much lower price than its prototype and still make a handsome profit.

"This is perhaps a typical example of why the European machine tool builder can make a fair profit, whereas we Americans with our excellent plants and efficient organizations have a hard time squeezing a little profit out of our businesses."

"Are European manufacturers making a special study of American designs?"

"Yes. All of us are visited frequently by European engineers, many of whom are from machine tool plants. They come here to see our shops, to study our production methods and to attend our various expositions. While we may not like this, we are doing exactly the same thing in Europe, studying the good points of European designs and realizing that America is not the only place where ingenuity exists."

"How does European electrical equipment compare with American on machine tool devices and controls?"

"We are far ahead of Europe. Our rating on motor horsepower is higher and the frames of our motors for a given horsepower are smaller. To keep down the price of motors, European builders rate for virtually momentary overload capacity, whereas the American system permits a much longer overload period for a given horsepower. For example, if a machine requires a 15-hp. motor under the American rating for capacity, a foreign motor of at least 20 hp. should be specified.

"Control apparatus in the United States is highly developed, being small and compact. The push button system is almost universal. The European controls, on the other hand, are large bulky affairs and are unsightly on machine tools. At various expositions I met electrical experts who were studying the new American controls on the imported machines. European electrical manufacturers realize that changes must be made in their products in an effort to bring them up to date. In Europe, adjustable speed direct-current motors cannot usually be had on short notice, and, in case this type is required, it is gen-

erally ordered in the United States. However, practically all of the shops abroad are run on alternating current.

"It is interesting to note that in several European countries the old time 'pillar-type control' is still used for motor starting. This consists of a large box standing far enough away from the machine to permit free movement of the operator. It is in sharp contrast with the present American plan of having the starting device incorporated in a small unit on the machine."

"In the European machine tool industry is there anything comparable with the cartels among iron and steel manufacturers?"

"Yes. This is especially true in Germany, where certain builders agree to concentrate on the production of certain types and sizes of machine tools, thereby claiming to reduce costs and to avoid making a jobbing shop out of the plant."

Rolling Practice in Russia

Old Mills Are Operated at High Speed and Being Rapidly Worn Out—Method of Making Ural Roofing Iron

EQUIPMENT in steel mills in South Russia is reported to be very inadequate, in an address made by F. L. Estep of Perin & Marshall, consulting engineers, New York, at Pittsburgh before the Association of Iron and Steel Electrical Engineers. What follows is from his paper. This equipment was all installed previous to 1914 and the plants have been run to the limit to get production, and have had poor maintenance.

In spite of the handicaps of coal and coke high in sulphur and of the mills gradually wearing out, the steel was reported exceptionally good. There is plenty of good, cheap manganese. A clean steel is made in open-hearth furnaces, due to the fact that two slags usually are taken off. About 95 per cent of the steel rolled was direct from the ingot. This includes plates, skelp for large pipe, shapes, wire rods, etc. Only in sheets made from sheet bars was the practice similar to that in the United States.

Ingots as small as 215 lb. were noted. Others ran up to 5 or 6 tons, for rail making, and there were still heavier ones for plates.

In a rod mill of German design at Dnieprovski wire rod is rolled direct from a small ingot of 450 lb., 7 in. square, in 23 passes. The mill has three roughing stands, three intermediate, five first finishers and four second finishers. In the latter, with rolls 10½ in. in diameter, the last pass was at 594 r.p.m., or about 1510 ft. a minute, calling for expert manipulation. This mill was speeded up for a short while to a rate of 20.6 metric tons an hour, without any resultant trouble.

A mechanical repeater for comparatively moderate sizes, going from a square section to an oval and back with one stand of rolls, was noted on this mill and the method is in use also in Germany. A billet 2¼ in. square was entered at the bottom and came up between the middle and top rolls, 16½ in. distant. It was then immediately sent into the bottom roll again at a distance of only 13½ in. This was on a mill with a delivery speed of about 800 ft. a minute. The three drafts in the one stand of 17¾-in. rolls averaged more than 40 per cent.

Making Roofing Iron

Manufacture of Russian roofing iron by the Ural process is of only one size—28 x 56 in. This is made in various weights, running from about No. 18 to No. 28 gage. No attention is paid, however, to the gage as such, as the entire operation is on the basis of weight of the sheet.

Roughing and finishing are done on one stand of rolls 22½ in. in diameter. These were rotating at 58 r.p.m., equivalent to a surface speed of 317 ft. a minute. This is the same as a speed of 40 r.p.m. on an American 30-in. sheet mill roll, and this speed was that employed day after day.

Russian roofing iron has a very high polish. It is finished in packs of four. The bars are roughed in pairs and matched into fours about as in this country. Fine hard-wood sawdust is thrown in between the sheets, both in roughing after the first pass and later in finishing. This not only lifts the scale, but tends to give the characteristic delicate brown color. The pairs are roughed to about 38 in. long, then packed in fours, reheated and finished. The scale loss in the furnace was estimated at 5 or 6 per cent.

Immediately after the sheets are finished, they are sheared roughly to over-length and over-width. They are then packed in a pile of about ¾ ton, protected top and bottom with old sheets, wrapped up and put in an annealing furnace for a high anneal.

Sheets Hammered All Over

When a pile of sheets, 10 or 12 in. thick, comes out of the furnace, it is put on a large anvil block under a heavy lever steam hammer. Operating at 80 strokes a minute with a peel slightly oval, this makes a dent on the sheet 1½ in. wide and 3 or 4 in. long, like a comparatively light pock-mark. The pile of sheets is shoved around with crowbars so that the peel will hit it here, there and everywhere.

Then the pack is shoved off the block and is repacked with other sheets on top; this is repeated four or five times. The sheets are pounded until they are quite cold. After this they are sheared to final width and length and then weighed, one sheet at a time, and put in different bins. The classification is by weight only.

When finished these sheets have a brownish color and are highly polished by the action of the hammer. These indentations all over the sheet can hardly be felt by running the hand over it. The operation is very expensive, in that the tonnage is low compared with ordinary sheet rolling. It is justified, however, by the high premium which these sheets command (nearly ¼c. a pound).

Bronze Bearings Need Not Be "Run In"

Excellent results can be secured from bronze bearings only when the bushings are carefully fitted, in the opinion of C. H. Bierbaum, vice-president Lumen Bearing Co., Buffalo, N. Y. Speaking before the American Society for Steel Treating, Hartford Chapter, he vigorously condemned the practice of driving a ball head through a bushing. Best practice with bearings, either new or after repairing by sweating on a thin layer, is to bore to within a few thousandths. The bearing is then finished to exact size, within the admissible tolerance, by means of a rapidly revolving diamond cutter. This method of final finishing makes it unnecessary to "run in" a bearing.

Well-Designed Enameling Plant

Special Handling of Castings, Close Control of Enamels and Firing, and Cleanliness All Contribute to High Quality Work and Low Percentage of Wasters

CLEANLINESS and illumination are the conspicuous features of the new plant of the Toledo Porcelain Enamel Products Co., Toledo, Ohio. It occupies a one-story building with saw tooth roof, covering 40,000 sq. ft. of floor space. All the enameling work for Toledo Scale Co. is done here, together with white and colored finishes for other metal manufacturers.

Straight line movement of the work is provided in this very conveniently arranged plant. Work starts in one of two separate departments, depending upon whether it is sheet metal, which is dipped, or cast iron, which is sprayed. Work from the two departments converges at the drying ovens.

Preparation of Sheet Metal

Outstanding features of the pickling room for cleaning pressed steel parts are cleanliness and freedom from fumes. It is 48 x 22 ft. in size and completely partitioned from the rest of the plant. Ventilation is furnished by two exhaust fans and the windows in the saw tooth roof. Six pickling and rinsing tanks, 7 ft. long, 4 ft. wide and 4 ft. deep, are arranged in a straight line. Work loaded in a Monel metal basket is handled in and out of the tanks by a 1000-lb. overhead electric crane, equipped with an operating lever and push-button control. After the last rinse, the work is carried in the same basket to an adjoining open top drying vat, 8 ft. x 10 ft. x 4 ft. deep, built of clay blocks. At the bottom are four rows of gas jets and through the vat wall at the floor level are several small openings for air circulation. As a rule work remains here only 30 sec., but if the parts are of such form that rinsing water might be caught in formed depressions, they are left in the drier until all water would be boiled out.

Preparation of Castings

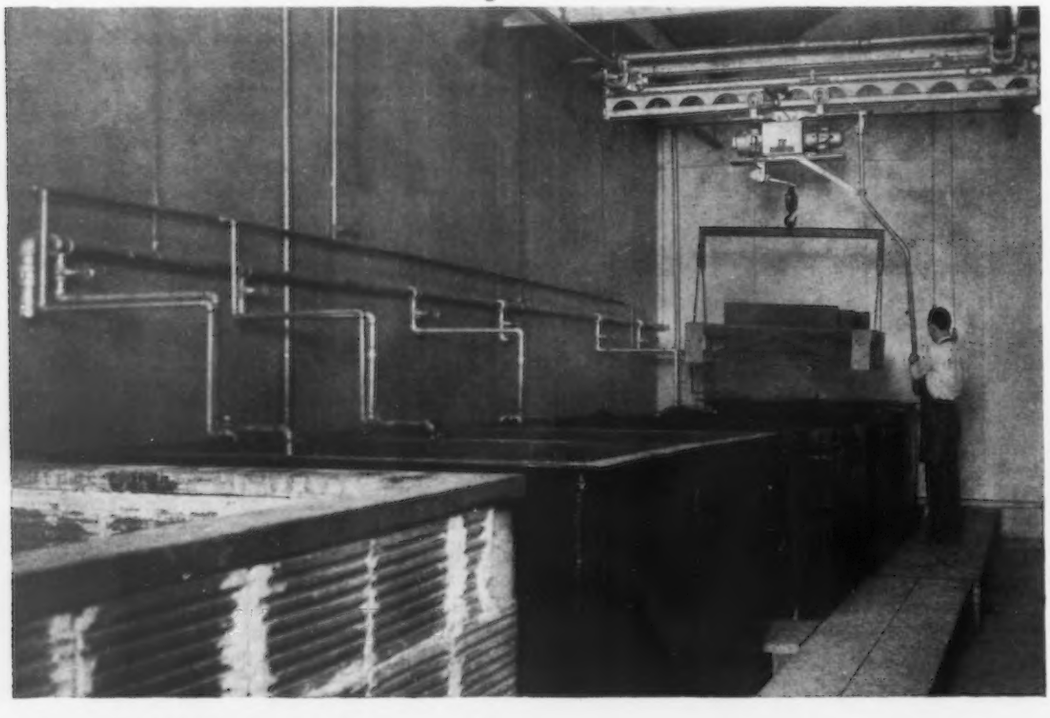
Castings are sand blasted in a cabinet (small parts in a sand blast barrel), and clean castings are immediately taken to an electrically heated drier. Keeping them at a temperature of 80 deg. Fahr. prevents any corrosion that might occur between sand blasting and spraying. This drier occupies a space 30 x 15 ft. adjoining the sand blast room and the spray booths.

A special putty has been developed by the company for filling holes in castings that would otherwise have to be scrapped. Any necessary puttying is done after the castings leave the storage drier on their way to the spray booths. With the use of this putty, rejections have been reduced to 1 per cent.

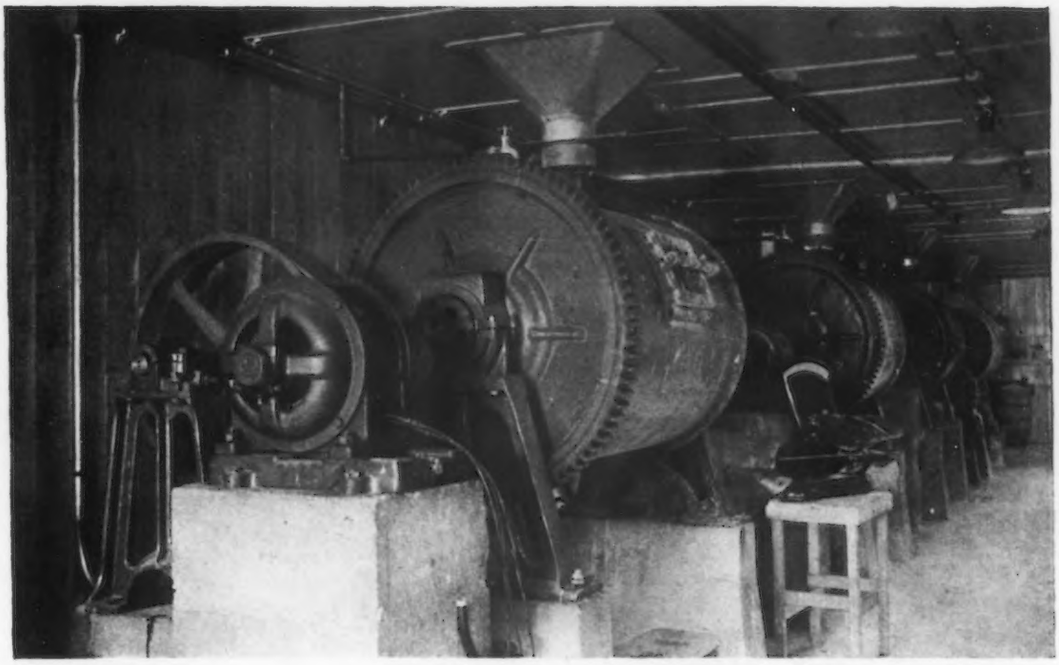
Preparation of Enamel

Since enamel for the ground coat has a high specific gravity and the glass settles quickly, there is a danger of non-uniform coatings. Uniform mixture is therefore maintained by stirring the enamel in an agitator developed in the plant.

Frit, the raw material for the coating, is stocked on a mezzanine floor above the mill room. Batches are mixed in a dipper of 1000-lb. capacity, so designed that a barrel of frit can be dumped without lifting into the dipper placed on the floor. Loaded dippers are then handled on a monorail. (This monorail track extends out over a receiving



CLEANLINESS and Freedom from Fumes Are Features of the Pickling Room. Work is dried in the open-top drying tank at the right



VIEW in the Mill Room Showing the Grinding Mills and the Method of Loading Them Through Hoppers from the Storage Room Above

bay below, and is used for hoisting raw materials to the mezzanine floor.) The dipper when loaded with frit is carried to a scale, and other materials are added to compound the enamel.

The weighed batch is then carried away by the monorail and dumped into one of six hoppers extending from the mezzanine floor to the mill room below, each feeding a mill. A weighed amount of water is put into the mills with the mixture.

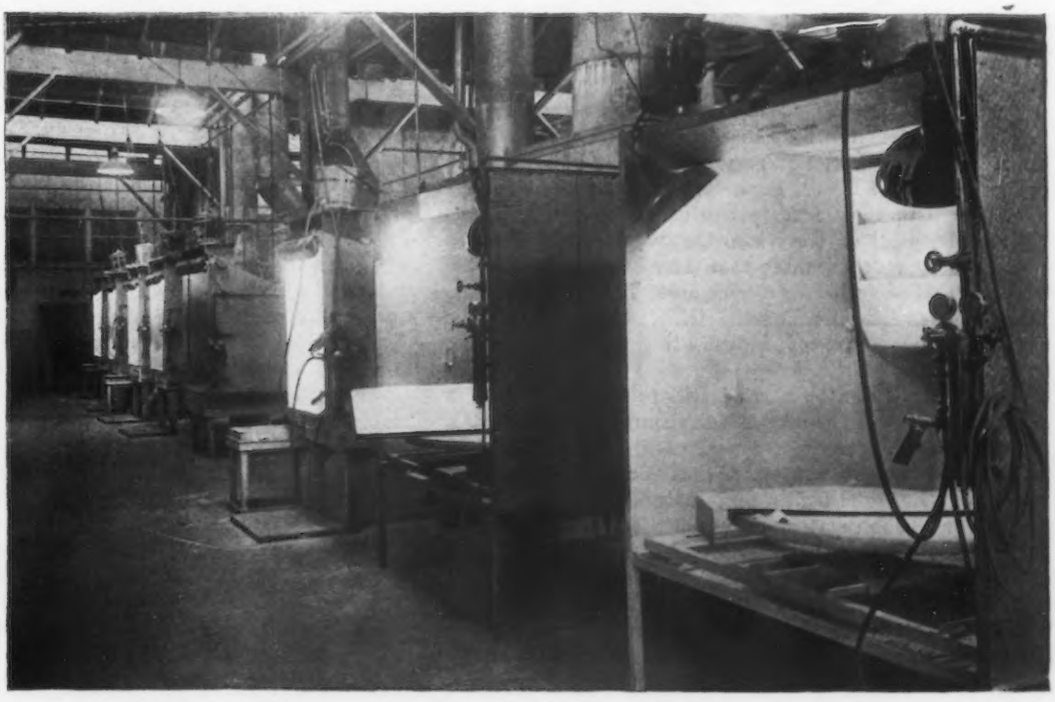
Each grinding mill has individual motor and Texrope drives. These ball mills are 48 x 36 in., set approximately 30 in. above the floor, thus providing sufficient room to clear a receiving barrel on a low hand truck. Pebbles washed out of the barrel are dumped into a portable sink and wash water passes to a settling basin in the concrete floor, where the enamel it contains is recovered.

All castings are spray-enameled in DeVilbiss spray booths, eight of which are arranged in a line. Two additional booths are placed at other points.

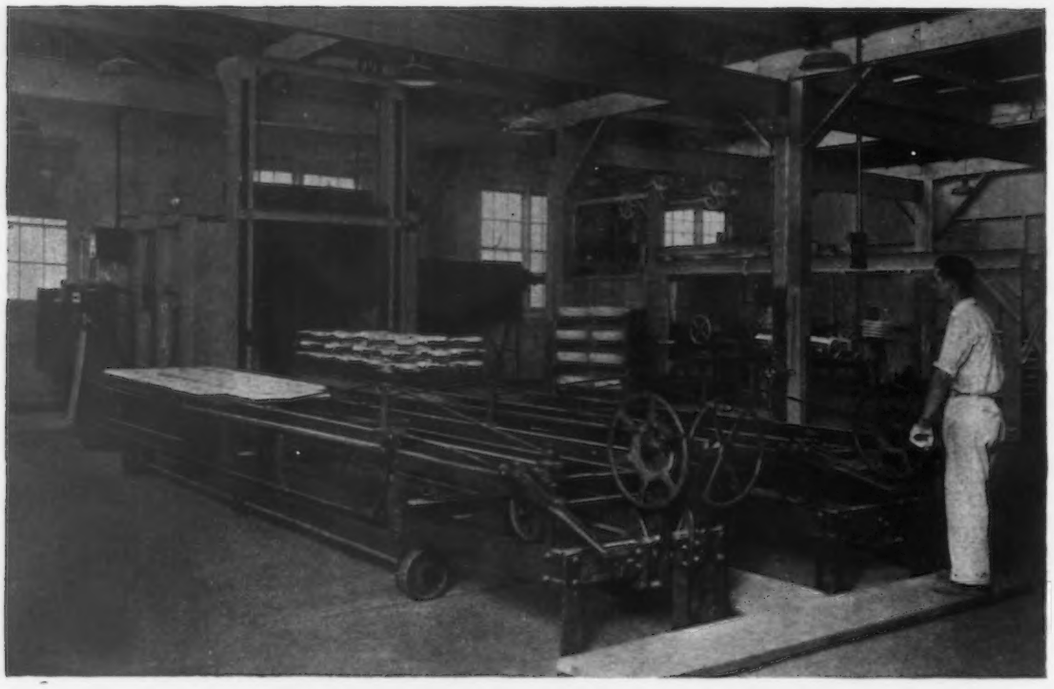
Castings after spraying are placed on trucks and dried. A second drier alongside is for sheet metal work that has been dipped. Each of these dry rooms is 44 ft. long and 22 ft. wide, built of pressed wood, insulated with 2 in. of mineral wool. A temperature of 135 deg. Fahr. is maintained by electrical heat. Air is kept in circulation by two fans, one at each corner, so that a uniform temperature is maintained throughout. Incoming air is filtered at the fans, outgoing air escapes at the bottom of the doors. There are doors on both sides of the driers sliding up and down, the loaded trucks go in one side and out the opposite. Work is kept in the drying room for 70 minutes.

Enamel coatings are burned on in three furnaces built by George J. Hagan Co., electrically heated and controlled. The inside dimensions are 4 by 10 ft. for steel (another one 5 x 11 ft. is to be erected), 3 x 6 ft. for cast iron, and 2 x 4 ft. for small special work.

The small furnace is used to burn small and miscel-



CASTINGS are Enameled in a Series of Spray Booths Arranged in a Straight Line



ENAMEL Coatings Are Burned on in Three Furnaces, Two of Which at the Right Background Are Provided with a Special Type of Unloading Fork

laneous lots. If a few pieces of similar size and shape are put into it at one time, and the treatment adjusted to the classification charged, a far better average of work is produced than though a large assortment of various sizes were burned at one time in a big furnace.

The two smaller furnaces (located in the background above) are loaded with a special device designed by the company. The loading fork is double-ended, and revolves about a center mast, from which it is hung from an overhead truck. Various movements, such as revolving and raising the fork, moving it in and out of the furnace, and lifting the furnace door, are all electrically controlled by an operator stationed at the center of the loader. A Pemco double loading fork is used for loading the largest furnace, shown in the foreground.

Specifications have been worked out for the time and temperature of burning on all parts, and the furnace operators follow these standard log sheets. The enamel is usually burned on cast iron at a temperature of 1320 deg. Fahr.; the time of burning is somewhat variable.

Before burning, machined surfaces of castings that are not to be coated are brushed off in one of two cleaning booths, each large enough to accommodate two workmen. Cleaning is done with motor-driven brushes.

Iron Oxide and Carbon in Open-Hearth Process

In considering the mechanism of carbon elimination in the open-hearth furnace, it has always been assumed that the reaction between carbon and ferrous oxide produced carbon monoxide gas at atmospheric pressure. Recent calculations from the best thermodynamic data available, made at the Pittsburgh Experiment Station of the United States Bureau of Mines, Department of Commerce, in cooperation with the Carnegie Institute of Technology and the metallurgical advisory board, show that this pressure may be very much greater than atmospheric, due to the large pressure exerted on a very small bubble by the surface tension of the liquid iron. This is analogous to the familiar phenomenon of superheating of liquids above their boiling points.

The analogy can be carried still further to explain a number of disputed points in open-hearth operation. An ordinary liquid, once it is superheated, can be caused to boil violently by the addition of glass beads or small solid particles. The solid bodies serve as nuclei for the formation of gas bubbles at much lower pressures than if no solids were present. Similarly, the familiar sight of a bath of steel "boiling on a rod" or "boiling on bottom" may be interpreted as the effect of the solid in providing a point of origin for the bubbles of carbon monoxide.

Since the amount of ferrous oxide in the bath necessary to cause carbon elimination at any given carbon content is proportional to this "excess pressure," it is felt that there are possibilities of lowering the iron oxide content of the bath, at a given carbon content, by reducing this "excess pressure" either by proper stirring or by some other method. The lower iron oxide content would reduce the amounts of inclusions formed on deoxidation and, to a smaller extent, the amount of deoxidizer necessary.

Steel Frame for Airplane Hangars Recommended

That the steel frame for airplane hangars possesses marked advantages over other types of construction is the gist of a report by Arthur Tappan North, architect, New York, who has completed a review of the housing problem at airports for the American Institute of Steel Construction. It is imperative, says Mr. North, that hangars be built so that they can readily be removed, rebuilt and remodeled with the least possible expense. He adds that the steel frame truss with horizontal lower chord of minimum depth, supported on masonry piers or steel columns, is the most suitable for hangar building construction, having the least weight and the greatest strength per unit of inclosed volume, and requires the minimum of foundation construction. He further says that the steel frame can be erected more rapidly than other types of fire-resistive construction and is more quickly available for use.

Checking Power in Plant Operation

Electric Furnace Requirements and Motor Drafts Are Watched—Portable Instrument Effects Economies at Central Alloy Steel Co.

BY B. H. GREENE*

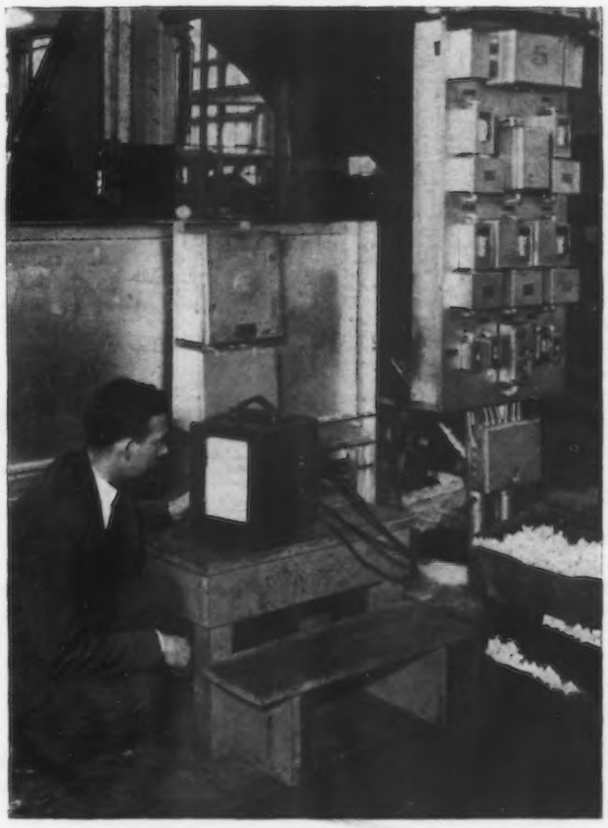
A PORTABLE recording wattmeter is regarded as one of the most widely useful instruments in our electrical shop. It has been used, for various purposes, on both day and night shifts for a period of two years, and many important savings have been effected as a result of the analyses which it has made possible.

The instrument used is a General Electric Type CP-4, with chart speeds of either 1 to 12 in. an hour, or 1 to 12 in. a minute. Potential coils, wound for 110, 220 or 550 volts, are built into the meter itself and other voltages are worked with equal ease by the use of potential transformers. Most of our meter studies are on circuits of either 11,000 or 2200 volts.

We have found this meter useful in checking the power input to blooming mills and bar mills. Detailed records have been made of power input to electric arc furnaces, and regulator performance on such furnaces has been carefully investigated. Equalization of feeder loadings has been effected by tests made at both main power plant and distribution substations. Load tests on rolling mills and other equipment have permitted modification of overload relay settings and thereby eliminated unnecessary interruptions of the power supply.

*Electrical engineer, Central Alloy Steel Co., Canton, Ohio.

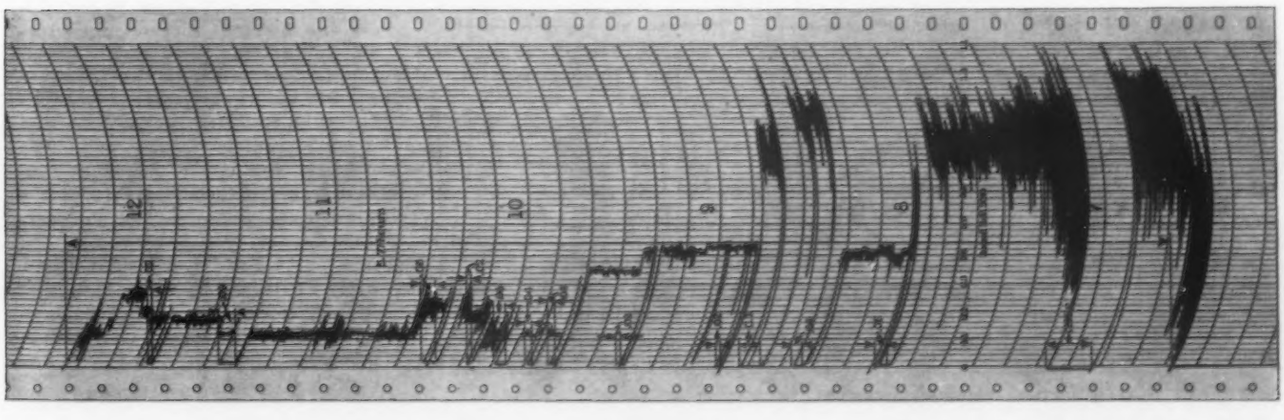
Mill input tests offer particularly good opportunities for reduction in power cost. This has been going on for several years and the executives of this company believe that other mills could profitably go into similar work much more thoroughly than has been the practice in the past. One reduction of power input by 1 kwhr. to each ton of steel rolled saved $250 a month in power costs at the present rate. This saving of $3,000 a year is far more than the cost of the instrument which made it possible.



POWER Was Off Thirteen Different Times in Less Than Six Hr., as Shown by Chart Below. Use of the apparatus, as above, is a simple matter after connections are properly made

Electric furnace tests have been in progress for the best part of the past year. The operation of transformers and arc regulators has been thoroughly investigated. Modification of regulator adjustments has appreciably reduced melting time in a number of cases, and the time and power savings have been sufficient to justify the permanent use of a recording wattmeter on every furnace. Plans have already been made for this.

The furnace chart shown in the accompanying illustration gives an example of the possibilities of this work. This chart taken on a 15-ton furnace (No. 20), shows a heat of 5.77-hr. duration. Power is shown to have been off 13 times during this heat, for periods of 0.02 to 0.23 hr. each. The total time loss was 0.55 hr., or about 9.5 per cent of the entire heat. The regula-



tor settings on this furnace were believed to be correct at the time the chart was taken, but there is evidently room for even greater improvement.

Charts are not available to show furnace operation before the regulator adjustments were made, but it is known that heats are now averaging at least a half-hour less than formerly. Each furnace averages four heats a day and the total saving of 2 hr. to the furnace is conservatively evaluated at $50 a day.

Load tests on motor circuits have improved the distribution of load among various prime mover units. Sources of poor power factor have been traced down in several instances in the course of such tests, and the average plant power factor has several times been improved.

On one occasion poor power factor on a feeder circuit was found to result from the underloading of a large induction motor, which, until the investigation was made, had been thought to be running from another feeder. The recording wattmeter gave all necessary information regarding the size of the motor actually needed. Incidentally, it showed that another motor, previously suspected of causing the trouble, was operating satisfactorily.

Relay settings have been improved on several occasions following tests with this meter. In the case of the rolling mills, particularly, this work is vitally important. Settings higher than necessary may permit serious and costly overloading of motors.

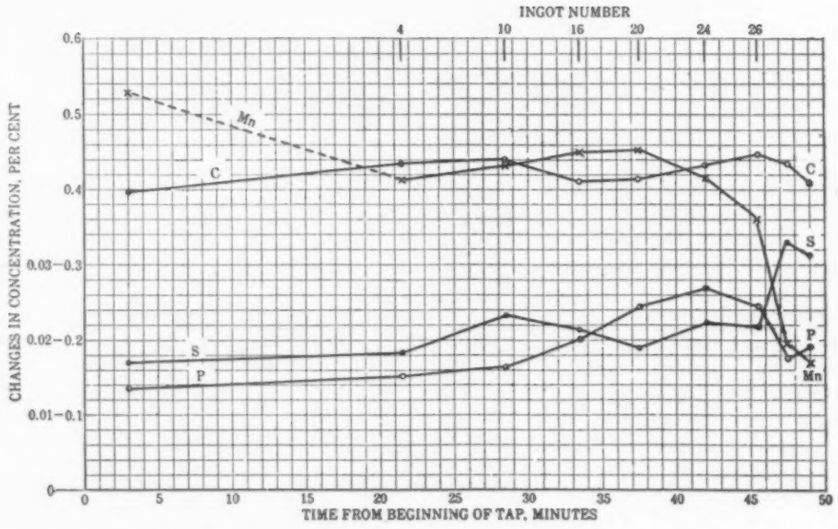
For every operating condition there is one setting which gives full protection to the motors and, at the same time, largely prevents the occurrence of unnecessary shut-downs. Avoiding the latter trouble is important from the standpoint of maintaining scheduled mill output, and also as an insurance against the freezing of a billet in the rolls.

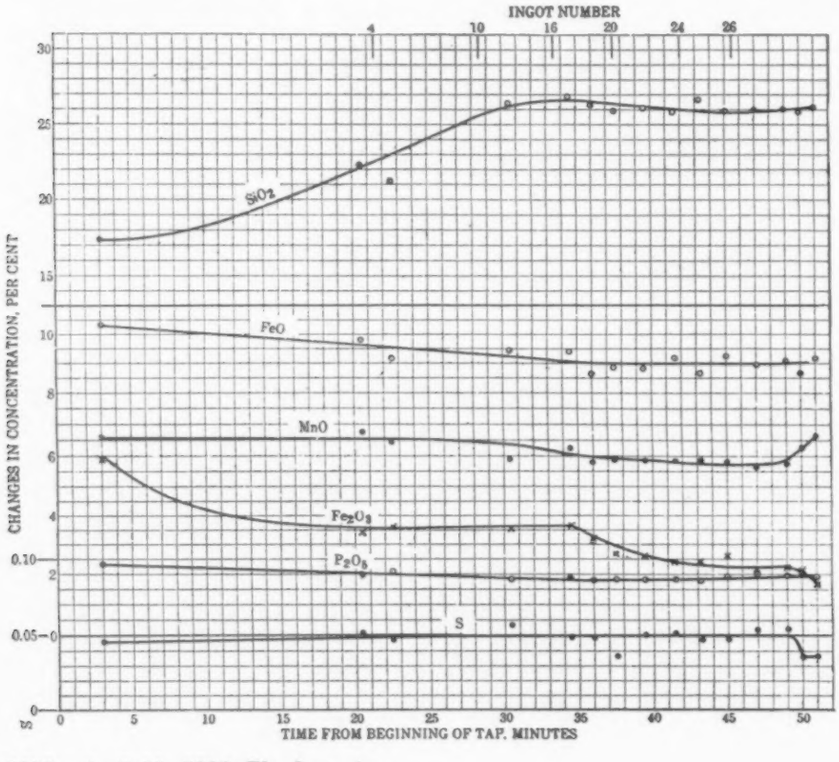
Ladle Changes in Constituents of Steel and Slag

SLAG action in a ladle of steel from the open-hearth furnace was discussed by Dr. C. H. Herty, Jr., last month at a round-table discussion on open-hearth steel held by the American Institute of Mining and Metallurgical Engineers. Reference to this subject was made on page 604 of our Feb. 28 issue. Pressure on our space prevented us from publishing at that time the two diagrams to which reference was there made. These are shown herewith.

Metalloids in Steel

One diagram shows the changes in the concentration of metalloids in the steel, beginning 3 min. after the start of tapping the heat from the furnace and running up to the twenty-eighth ingot teemed from the heat 46 min. later. This shows, among other things, the sharp reduction in the proportion of manganese as the last few ingots were reached. The sulphur took a sharp rise, while phosphorus made a similarly abrupt drop.



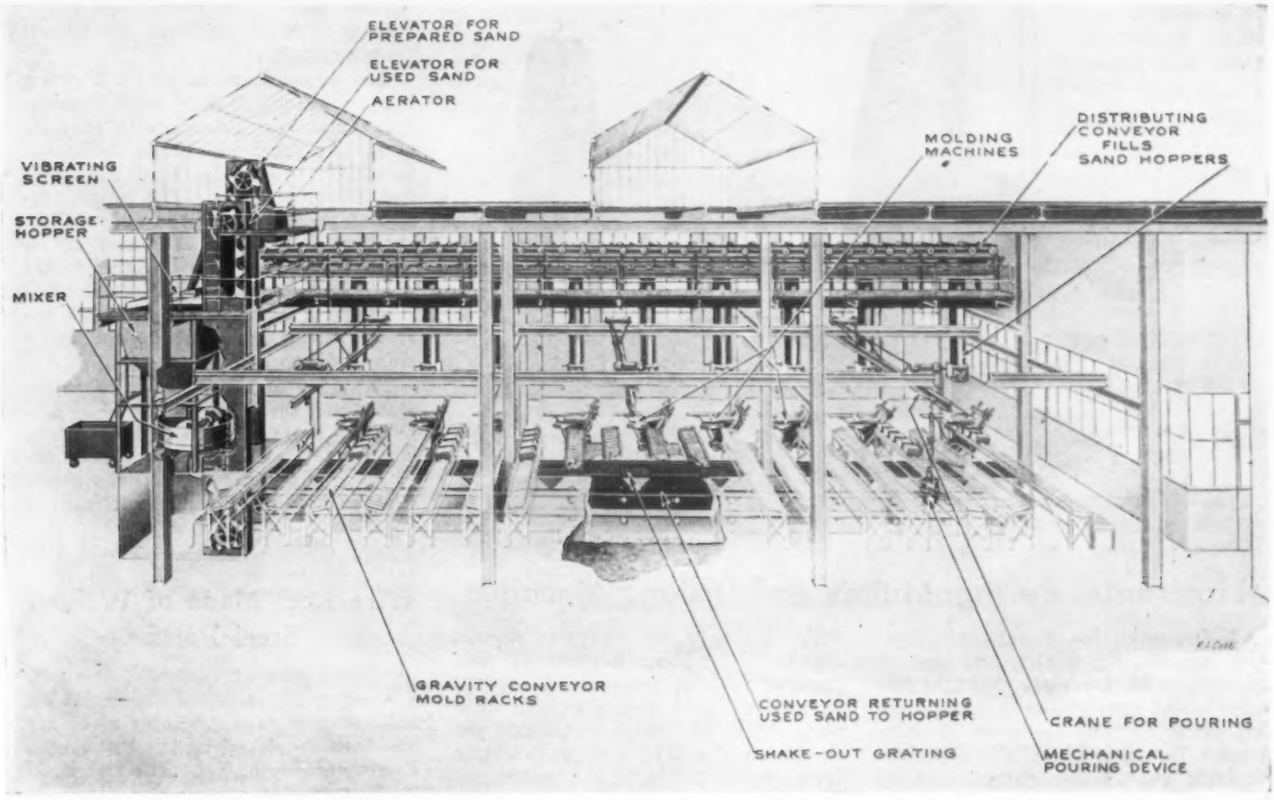


Changes in Composition of Steel Are Shown Above; Those in the Slag, at Left

Slag Constituents

In the other diagram is found a similar history of the concentration of the slag constituents. Most pronounced among the changes here is the rapid increase in silica from the time the heat was tapped until about 15 ingots had been poured. After this, the silica content was about stationary. At the same time, there was a considerable drop of iron oxide during the first portion of the period and then, after a time of stability, a further drop following the sixteenth ingot. Other elements show less abrupt changes, as will be noted from the curves.

Schematic View of Foundry with Sand System and Mold Conveyors



Mechanizing Foundry Operations of a Semi-Jobbing Character

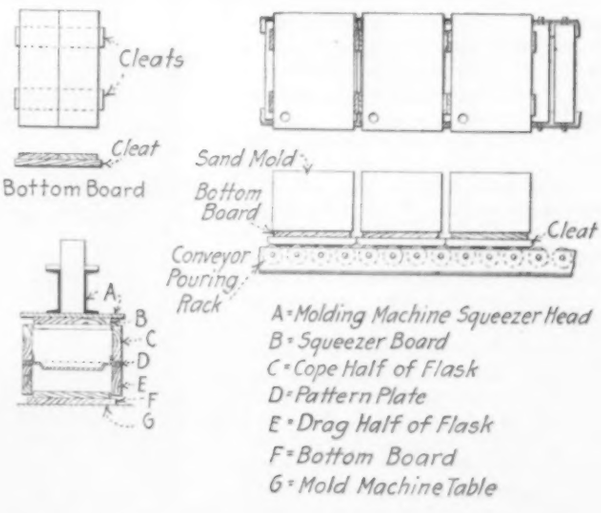
BY DAVID G. ANDERSON*

FOUNDRIES have found it difficult to justify the introduction of continuous practice, together with conveyor molding, in operations of a semi-jobbing character. The schematic view shows a unit in the brass foundry of the Western Electric Co., where several features have been introduced which, it is believed, would prove of advantage in the average type jobbing foundry. The distributing conveyor, which automatically fills sand hoppers provided for each individual molder, is of the scraper type.

The individual molder hoppers have a circular cross-section 14 in. in diameter where they join the conveyor and 16 in. at the opening gate. By having the hopper larger at the discharge end a positive flow of sand is assured. Moreover, with the scraper type conveyor, in contrast with the former plow type of filling device where the sand is distributed on a belt conveyor, the molder or an attendant is relieved of the necessity of watching the amount of sand in each storage bin and interrupting molding work while filling the hopper from the distributing belt.

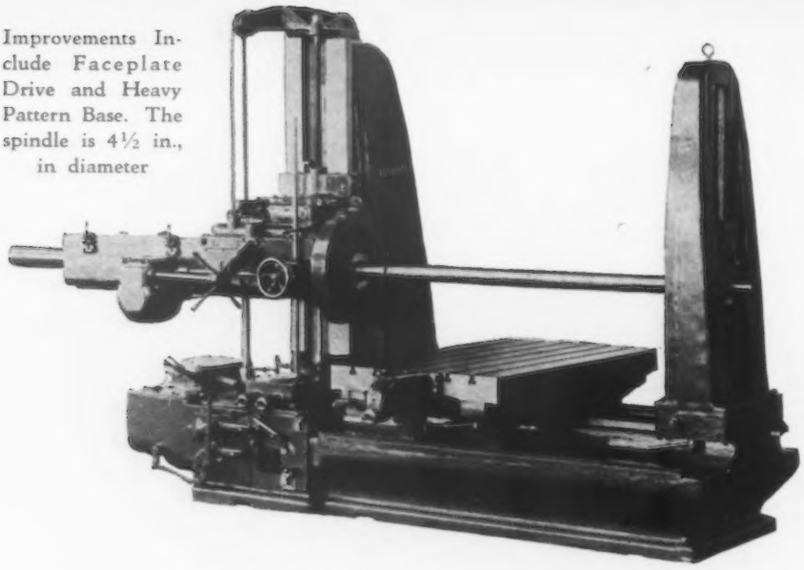
The molds are stored in line on a gravity roller conveyor, so that the correct pouring technique may be employed for each separate group of castings, a feature which is not presented to the pourer when the molds are placed on a moving conveyor and carried to a pouring station. With central pouring there is danger of confusion in the promiscuous serving of molds for light and heavy castings, with a proportionate increase in the number of defective castings.

Another feature that is of interest is the conveying of unprotected molds. Ordinarily molds are contained in iron or steel flasks when moved on a conveyor of the gravity roller type. Experiments developed the fact that unprotected molds could be successfully conveyed by employing projecting contacts, i.e., cleats of the board proper, which project about ½ in., making a separation of 1 in. between the molds, as shown in the illustration.



Unprotected Sand Molds Are Handled on a Gravity Roller Conveyor. Special cleated bottom boards serve to separate the molds on the conveyor

*Foundry engineer, Western Electric Co., Chicago.



Improvements Include Faceplate Drive and Heavy Pattern Base. The spindle is 4½ in., in diameter

Horizontal Boring, Milling and Drilling Machine

AN improved No. 6 horizontal boring, milling, drilling and tapping machine with faceplate drive to the spindle and heavy pattern base is being built by the Defiance Machine Works, Defiance, Ohio. The faceplate or back gear drive is recommended when milling cutters over 10 in. diameter are used.

The head and platen have independent rapid traverse in all directions, movement being at the rate of 84 in. per min. The head is entirely inclosed and, in common with the speed and feed boxes, is of unit construction. Speed and feed boxes are equipped with roller bearings and have force feed lubrication. Ball thrust bearings are provided for the spindle. The base is provided with outboard supports, giving a maximum width of 54 in., that have steel tracks upon which rollers under each end of the platten ride to support the overhang. The base, column and tail support are massive, and centralized control is a feature, as in the previous model. One lever controls the revolutions of the main boring spindle in either direction for tapping operations. There is an interlocking device for the quick travel and the power feed.

The machine is built with columns of three different heights, the maximum distances from the top of the platen to center of the spindle being 37, 48 or 60 in. It is also built with four bed lengths, giving a maximum distance from the nose of the spindle to the face of the tail support of 7, 8, 9 or 10 ft.

Principal specifications are: Spindle diameter, 4½ in.; Morse taper No. 6; spindle travel, 60 in.; distance from face of spindle sleeve to face of tail block, 7 ft.; distance from center of spindle to top of platen, 37 in.; vertical adjustment of spindle head, 37 in.; and standard working surface of platen, 36 x 75 in. Number of speed changes without faceplate drive back gear, 10; number of speed changes with back gear, 20; range of speeds, 3¾ to 157 r.p.m.; number of feed changes without faceplate drive, 12; number of feed changes with face plate drive, 24; ranges of feeds per revolution of spindle without faceplate drive, 0.006 to 0.495 in.; additional feeds with face plate drive, 0.012 to 0.990 in. The standard machine with 38 in. columns and 7 ft. bed weighs 31,415 lb. net. A 10-hp. 1200-r.p.m. motor is recommended for the drive.

Segment Wheel Developed for Blanchard Grinder

AN 11-in. segment wheel similar to the 18-in. wheel described in THE IRON AGE of Sept. 28, 1928, has been developed by the Blanchard Machine Co., Cambridge, Mass., for its No. 10 surface grinder. It may be mounted on the faceplate of the machine in the same manner as the standard ring wheel, with which it may be easily interchanged. Savings in abrasive cost, especially on medium and broad surface work, and faster and cooler cutting on broad surfaces, are advantanges claimed.

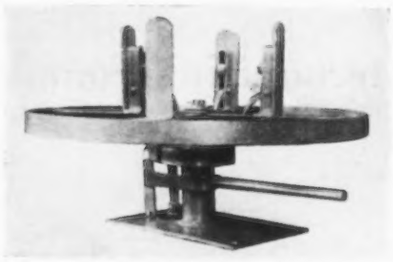
Savings in Abrasive, and Faster Cutting Are Advantages of the Segment Wheel

The wheel is made up of a chuck body machined from a solid forging, four abrasive segments with rounded ends, two fixed partitions or abutments secured in the chuck body, and two clamping units. The latter consist of shoes that fit the ends of the segments and are expanded by a wedge and screw, no backing plates nor holding screws being used. Adjusting or changing of segments involves merely the loosening and tightening of two screws.

The body of the wheel is cadmium plated and the other parts are of aluminum bronze, except the screw, which is of stainless steel. The abrasive segments are 5 in. deep when new, and 4 in. of this depth can be used.

Wire Reel Made of Welded Steel Parts

A NEW form of wire reel, or swift, especially adapted for use with cable or wire rope stranding machines has been developed by the Pittsburgh Producers Supply Co. The reel is 36 in. in diameter overall and about 24 in. high. It has a capacity of 300 lb. and a rated speed of 800 r.p.m. The jaws are adjustable to take coils from 12 to 30 in. inside diameter.



The Reel May Be Used with Wire Rope Stranding Machines

The whole reel is made up of steel sections cut to form and welded together, making an assembly considerably lighter and simpler than usual. The rim is formed of a 2 by ¼-in. section rolled to shape and butt welded. The hub consists of a plate 4 in. in diameter and ½ in. thick, to the circumference of which is welded a collar of seamless tubing 2 in. high. This collar provides an abutment for the T-sections making up the reel spider.

These sections, made of ¼-in. stock, are butt welded to the rim and the hub collar. They support the reel dogs, which are made of U-sections formed at the bottom to fit over the upper part of the T-section of the spider. They are bolted to the face plate, and the whole is adjustable by means of a dog which fits in holes drilled in the T-section. The face plates are removable.

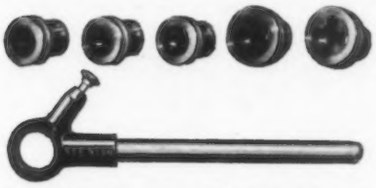
The standard is made from a piece

of extra heavy 3-in. seamless tubing, welded to a heavy 20 x 20-in. flat plate, with bolt holes at the corners for mounting. The center shaft, of 1½-in. steel, is mounted in two Timken bearings, which support the whole load of the reel and spider, and serving as guide bearings for the shaft. A simple form of brake rigging is used, being a U-section bolted to two studs which are welded to the base plate. The wooden brake shoe is bolted to the upper portion of the U. The brake drum consists of a plate spider welded to the shaft, to which is welded a rolled section, to form the drum.

The operating mechanism is made of a piece of seamless tubing welded to a U-section, the ends of which are lap welded to the U carrying the brake shoe.

Ratchet Stocks With ⅛ to ¾-In. Capacity

RATCHET stocks, equipped with solid round steel dies, in capacities from ⅛ to ¾ in., inclusive, are now being manufactured by the Nye Tool & Machine Works, 4120 West Fullerton Avenue, Chicago. The dies are held in place by two stationary studs, to prevent turning, and are locked in place by a screw cap which may readily be removed.



The Solid Dies Are Held in Place by Studs

Selective-Die Punch Press Has Nibbling Attachment

FOR the sheet metal department of automobile body, metal furniture and other manufacturing plants, the Zeh & Hahnemann Co., 184 Vanderpool Street, Newark, N. J., is building a punch press having six punches and dies, which are brought into action selectively by pressing corresponding buttons. The machine is also equipped with a nibbling attachment that permits cutting of shapes and openings of any form at the rate of 36 in. per min.

The maximum capacity is a ¾-in. hole in 3/16-in. sheet steel, and the depth of throat being 24 in., the machine will punch to the center of 48-in. sheets. The standard punches and dies furnished are ¾, ⅝, ½, ⅜, ¼ and ⅛-in. in diameter. The punch is treadle controlled and stops automatically at the high point of the stroke. The strippers are arranged to allow the use of the so-called horseshoe system of gaging. A master template with suitable gaging points may be clamped to the sheet or pack of sheets and all holes punched accurately without marking.

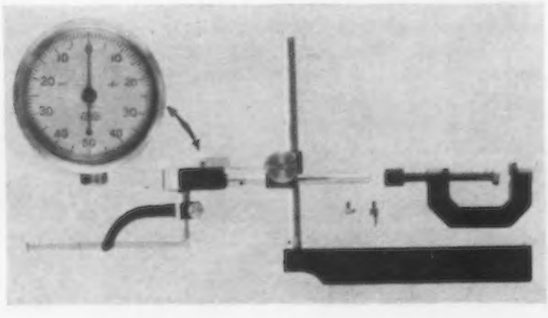
A 1-hp. direct-connected motor drive can be furnished if desired. The driving wheel is 26 in. in diameter and runs at 120 r.p.m. The machine, designated as the No. 4-4B, weighs 2500 lb.

Selective Multiple Punching Can Be Done, and Shapes Can Be Cut by the Nibbler

Compact Dial Indicator Set

WIDE range of adjustability and compactness, that permits use in narrow places and in holes, are features of a new universal dial indicator set that is being offered by the Brown & Sharpe Mfg. Co., Providence, for all types of testing, setting up and inspecting work. The set consists of a dial indicator with hole attachment, bar with upright rod, clamp, slide with indicator rod and three chromium-plated contact points. The small diameter of the indicating dial, 1 11/16 in., permits insertion between the throws of a crankshaft for inspecting bearings and pins. The set is adapted for use in the tool posts of lathes, on planer tools or milling machine arbors and on universal surface gages.

In addition to small size, a feature of the dial indicator is its durable construction. The helical type cam which is the heart of the mechanism is in four sections, each of which may be turned and brought into play if wear or accident should impair the accuracy of the indicator. The dial is graduated in 0.001 in. and has a range of 1/10 in. each side of zero. It is adjustable, and by turning the knurled rim, the zero may be brought into any position. The tool is designated as the No. 740.



The Set Can Be Used in Narrow Places and in Holes. It may be applied to the toolpost of a lathe, and on a planer tool or milling machine arbor

Corrugated Pot for Faster Heating

CYANIDE and lead hardening furnaces may be operated at greater speed by the use of corrugated pots, it is said by Hevi-Duty Electric Co., Milwaukee, which has brought out the pot illustrated, for this purpose.

The new corrugated pot for cyanide and lead hardening furnaces has been designed to increase the productive capacity of this type of equipment. The corrugations provide approximately 30 per cent more heat releasing and receiving surface than a straight-side pot of equal holding capacity.

It is said that a marked increase in production is effected, the coils operate at reduced temperatures and the heating-up time is materially reduced. The corrugations also establish sufficient pinch effect in the material to secure a stirring action. This insures uniform distribution of temperature and conducts the heat from the walls rapidly.

Corrugations Are Said to Improve Heating by 30 Per Cent

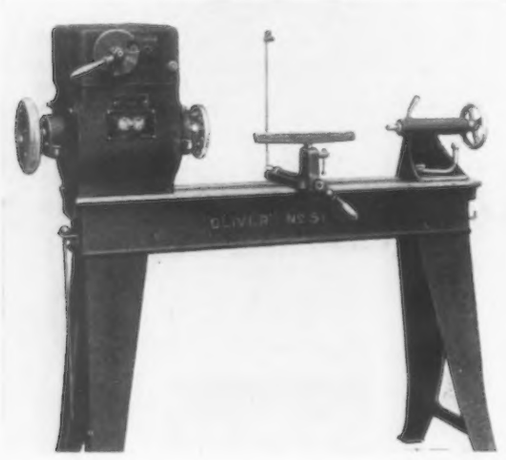
Wheeling Steel Corporation, Wheeling, W. Va., has completed a moving picture of the process of manufacturing steel pipe from the raw material to the finished product. The film shows scenes in the ore mines in Minnesota, the loading and unloading of ore boats, coal mining operations and the making of pig iron and steel. The picture will be used by the sales department for the instruction of salesmen, distributers and consumers.

Speed Lathe with Motor and Controls in Headstock

WITH the motor, its control and protective devices incorporated in a single housing, simplicity is an outstanding feature of the new unit-type headstock speed lathe recently brought out by the Oliver Machinery Co., Grand Rapids, Mich. The machine is offered for pattern shop and other uses.

The ½-hp. motor employed is of four-speed type and operates under full load at approximately 600, 1200, 1800 and 3600 r.p.m. The rotor is mounted on a hollow steel spindle and rotates on ball bearings that take end thrust in both directions. The controller is located directly above the motor, and all wiring between the motor and controller is inclosed in the motor housing. A drum, rotated by the speed lever toward the operator, determines the speed of the motor. The arrangement is such that the motor can be started at 600 r.p.m. only, but can be stopped instantly at any other speed by pushing the stop button located nearest the operator. This feature prevents the operator from inadvertently starting the motor at high speed. Dynamic braking is accomplished by turning the speed lever from one speed to a lower speed.

By the removal of four screws the entire control is exposed to inspection. The headstock unit can be removed easily by releasing two steel straps located underneath the ways of the lathe bed. An added feature of the unit construction is that it permits converting belt-driven speed lathes to motor headstock type without fitting a separate controller and without wiring. The same combination can be furnished for three-phase, two-phase or single-phase alternating current. A new "Faultless" tool rest holder, operated by an eccentric lever, can be supplied with this machine.

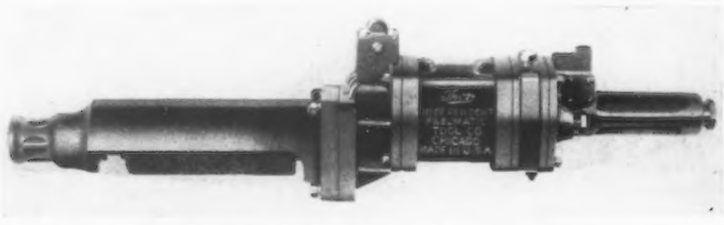


THE Motor, Its Control and Protective Devices Are in a Single Housing. The ½-hp. motor operates under full load at 600, 1200, 1800 and 3600 r.p.m., but can be started at 600 r.p.m. only

Pneumatic Grinder for Locomotive Parts

WORK for which the pneumatic rod grinder here illustrated is adapted includes the surfacing of locomotive frame jaws, rods, straps, rod brasses, shoes and wedges, valve motion parts and welds. The wheel guard is small enough in diameter to permit use of the tool in a 2¾-in. space.

The machine is manufactured by the Independent Pneumatic Tool Co., 600 West Jackson Boulevard, Chicago, in two lengths of wheel, 6 and 9 in. Both grinders employ a 2½-in. diameter emery wheel with ¾-in. hole, and operate at 7000 r.p.m. The 6-in. machine is 26 in. long and weighs 21½ lb. and the 9-in. grinder is 29 in. long and weighs 23¾ lb.



The Wheel Guard Is Designed to Permit Use of the Grinder in Narrow Places

Pumps For Handling Acids

CENTRIFUGAL acid pumps lined with chemical stoneware are being made by the United States Stoneware Co., Akron, Ohio. These pumps are said to be incorrodible, as all parts which come in contact with the liquid are made of acid-proof chemical stoneware. This includes the casing, the impeller and those portions of the shaft, etc., which enter the chamber where liquids are handled.

With the sole exception of hydrofluoric acid, the company recommends these pumps for handling all acids, alkalis, chemicals and corrosive solutions, whether weak or strong. The packing in the stuffing boxes is a specially prepared acid-proof asbestos, while the pump is made with a rugged cast iron base, fitted with adequate space and a flexible coupling for mounting a motor, or with pulley for drive by belt. The pumps are offered in two standard sizes, having capacities of 225 and 500 gal. a minute.

Machine Salvages Brass from Light Bulbs

THE salvaging of brass shells of burned-out incandescent lamps is the purpose of a new machine, called a rumbler, which is now being used by the New York Edison Co., 130 East Fifteenth Street, New York. The new machine, which is motor driven, consists of a revolving steel cylinder, the inside of which is perforated with many holes not quite large enough for the brass shells to fall through. Two long steel bars covered with prongs are placed among the glass bulbs in the cylinder, and as the rumbler revolves, the glass, filaments, wires and cement are knocked loose from the brass ends and fall through the holes into a steel drawer. The company collects about 300,000 worn-out bulbs each year from its offices and stations.

To Commemorate First Steam Engine in America

A bronze tablet is to be unveiled April 24 on the grave of Josiah Hornblower at Belleville, N. J. This will be done by the Newcomen Society in commemoration of the fact that Mr. Hornblower brought from England, in 1753, and erected the first steam "fire" engine in this country. This action results from the work of a committee appointed a year ago, consisting of L. F. Loree, chairman; Dr. Fred R. Low, and Major C. E. Davies.

Following the unveiling ceremonies at Belleville there will be the annual dinner and a meeting of the society in the Engineers' Club, New York, at which three papers will be read. L. F. Loree will discuss the "First Steam Engine in America," John H. Barr will detail the "Evolution of the Writing Machine" and Dendy Marshall will present with slides a paper on the "Rainhill Locomotive Trials of 1892." This paper is to be presented also at the simultaneous meeting of the society in England.

Urges Cooperative Steel Advertising

Aggressive, United Campaign Is Necessary, Says Charles F. Abbott, to Wipe Out Excess Capacity and to Meet Competition of Substitutes

THE greatest drawback to the extension of the market for steel in the United States is the lack of a full appreciation of what advertising can do, declared Charles F. Abbott, executive director of the American Institute of Steel Construction, Inc., in an address before the Industrial Advertisers Association of Cleveland, April 5. He said, in part:

"There are unquestionably economic factors disquieting to many of us. The possibility that mass production may outstrip consumption has led to the belief that our problems are due largely to excess plant capacities.

"The real trouble, in many cases, is not of itself excess capacities, but rather the inability to divert thinking and planning from questions of production to those that relate to the market and distribution of the finished product.

"It is much easier to produce than to sell; easier to control costs than it is to obtain profits. Efficiency in plant production has reduced costs to the minimum and, therefore, if relief is to be expected from many of the perplexing problems, it must come from similar attention devoted to the market and distribution methods.

"A leader in the steel industry has referred to an expenditure of $169,000,000 to modernize plants and reduce costs, only to find that all of the savings made possible by this huge investment were dissipated by a failure to maintain efficient marketing policies.

Use of Structural Steel Can Be Greatly Expanded

"It has been clearly demonstrated that the consumption of fabricated structural steel could be increased to 5,000,000 tons annually by developing the present market and promoting new uses.

"I have been assured by a prominent executive of one of the larger producing mills that such an increase could easily be accomplished by cooperative effort. Once obtained, it would mean that the present mill capacity would be unable to roll the shapes and the present combined fabricating shops would be unable to fabricate the steel. It is obvious, therefore, that an increase in the present market, combined with the development of new uses, would meet the problem of any excess plant capacities that might exist in the structural steel industry.

"Similar relief could undoubtedly be found throughout other branches of the steel industry, if the proper attention were devoted to the exploitation of present markets, combined with the application of research to promote new uses.

PRESENT-DAY conditions call for an aggressive, cooperative advertising campaign to make the public steel-conscious.

The steel industry is confronted by competition from the producers of copper, aluminum and other substitute products.

The public should be informed that steel has no substitute, and that it offers the greatest permanency, safety and economy wherever used.

Cooperative Advertising Essential

"To accomplish such a result it is essential for the steel industry to recognize the vital need of cooperative advertising to the public in order to reinforce the activities of individual effort. Advertising in the past has been too frequently considered either as an item of expense or a contribution to trade publications to sustain cordial relations. The idea of advertising as an investment from which very definite returns might be expected is not generally accepted in the steel industry.

"The mere fact that total advertising appropriations in this country for 1929 exceed by 20 per cent those for 1928 points very clearly to the importance of advertising to successful and profitable industries.

"The lumber industry hesitated to adopt advertising for a long period, during which time the makers of lumber substitutes, who were extensive national advertisers, encroached upon the market for lumber to a serious extent and displaced its use. The lumber industry has now raised a substantial appropriation to be expended annually to regain the market already lost and to develop new uses.

"There is no more impressive demonstration than that of the cement industry, whose aggressive advertising has been, to a large extent, responsible for a phenomenal increase in the consumption of cement in a comparatively short period of time. A considerable sum is appropriated each year for national advertising, which is effectively making people think of cement and understand its various uses. It is a commendable effort, which has proved successful and profitable because the leaders in the industry supported their faith in advertising by substantial contributions.

"The cotton textile industry has suffered for some time from an excess plant capacity. This condition, to a large extent, has been due to a neglect of the market and failure to recognize distribution as its principal problem. The industry has now planned an aggressive campaign to revive a declining market and to exploit new uses. What a different story, had a cooperative national advertising campaign been active during the years when the industry refused to place any faith in its influences.

"The sauerkraut industry has appropriated $300,000 annually, and, through the application of intelligent advertising, has increased the consumption of sauerkraut over 20 per cent. If the public responds so readily to sauerkraut advertising, a similar response should be expected for steel or any other product.

"To permit a continued excess of plant capacity, through failure to develop markets, forces a scramble for business at costs, or even lower, to fill the existing plants, and even then business is frequently not obtained in sufficient balance to keep plants running. Increased consumption and the development of new uses would remove the excess plant feature.

Sharp Competition from Other Industries

"Today the steel industry is confronted by competition from the producers of copper, aluminum and other substitute products, and only the fact that manufacturers outside of the steel industry, on their own initiative, have been constantly discovering new uses for steel has made it possible for the steel producers to continue on their way, blind to their lost opportunities. And yet there are some who still refuse to believe that advertising steel would prove practicable or that it is necessary. This belief is no doubt inspired by a production mind, developed to think in terms of per ton per day output.

"In the past there was little need for selling effort, as the only problem

was to produce the steel to meet existing demands. Conditions have changed; demand must be stimulated if production schedules are to be met.

"In the structural steel industry the completion of a skyscraper represents the greatest of all advertising mediums. The Woolworth Building, the Chicago Tribune Building, the Wrigley Building—and now comes the Chrysler Building—all have proved their worth in promoting world-wide advertising for concerns and individuals whose names have been applied to the structures.

"The same is true of the great steel bridges. The $65,000,000 Hudson River Bridge, with its 3500-ft. span, double that of any existing structure, the 1675-ft. arch from Staten Island to New Jersey, the great Detroit-Windsor bridge now building, and many other spectacular structures, not only in this country, but abroad, are tangible advertisements of the power of the American steel industry. Such bridges would never have been possible without steel, and steel of the quality obtainable only within the past few years.

"No other material could serve for any such monumental structures. It is possible, as proved by eminent authorities, to cross the Narrows of New York Bay with a single span 4450 ft. in length, which, it is estimated, might be constructed at present rates for less than $100,000,000, thereby supplying a gateway to a nation's commerce and a monument to the nation's genius. By no possibility of imagination could such a structure be created without structural steel of the superior quality produced by the American rolling mills.

"Why should the steel industry be content to permit the public, as it admires a great structure, to obtain its chief impression of grandeur from the masonry coating rather than from steel, with its permanency, strength, security and economy—the material that made possible the object of their great admiration?

Must Make the Public Steel-Conscious

"Present-day conditions call for an aggressive, cooperative advertising campaign to feature steel—its merits and advantages—that the public may be made steel-conscious and be made to appreciate the contribution of steel to the advancement of civilization. The public should be informed that steel has no substitute and that it offers the greatest permanency, safety and economy wherever it is used.

"The steel industry eventually will have to follow the suggestion of its more far-sighted leaders. The sooner the industry turns to a sound advertising policy with investment value as the incentive, the sooner will it find itself in a position to meet and overcome many of its most vexing problems. Consumption will be increased, excess plant capacities will be overcome, profits will be advanced and the industry will take its place among the other great American industries that have so successfully produced constantly increasing profit records through the creation of new uses and the exploitation of existing markets.

"Advertising has proved the best means of stimulating desire so far as an industry is concerned. So long as the elements used are truth, skill and a sound knowledge of market conditions, advertising will continue to advance industry through the bewildering mazes of the transition it is undergoing. The industry which grasps the full meaning of the new form of competition, and adapts its policies to meet it, will inevitably outstrip those who are unable to recognize the change that confronts them, or who fail to place the proper valuation upon public opinion as the controlling factor in industrial progress."

Research Yields Results in New England

Survey Discloses Effective Methods of Stabilizing Employment and Diversifying Production

THE Research Committee of the New England Council has just issued its final report, following an extended survey to discover ways of building up New England industries. The report covers in detail instances in which fact-finding and interpretation have been used to stabilize working forces and employment programs in a wide field of manufacturing, including the shoe, textile, machinery, toy, paper and silverware industries. The Policyholders Service Bureau of the Metropolitan Life Insurance Co. aided the council in its research.

In connection with the general survey, the Dennison Mfg. Co., Framingham, Mass., maker of paper products, conducted a research designed to overcome, as far as possible, the seasonal character of the company's business.

The employment situation was also studied. Six ways of reducing irregularity in employment were worked out, but they failed to make it possible entirely to dispense with an unemployment fund, which tides permament employees over times when work cannot be supplied by the company. The fund is an accumulation out of profits covering a five-year period. It is not a charity; it does not constitute an unlimited guarantee, either of employment or of the maintenance of the regular wage rate, nor is there any stipulation that the fund may be renewed. The fund is administered by a small committee, with membership equally divided between management and works committee representatives. Whenever there is actual unemployment, the fund becomes operative.

Employees of more than six months' service, who are temporarily laid off, receive 80 per cent of their wages if they have dependents, and 60 per cent if they have no dependents, except for the omission of compensation for one day in every 14 consecutive days. This scheme allows the slack department to lay off workers on Saturday mornings, in large groups if necessary, and to conserve the work for other days. Employees, when they secure temporary work outside, are entitled to receive the difference between their outside earnings and their regular wages, if that amount does not equal more than they would be allowed if they did not work.

Employees who are transferred to other work within the plant are paid their full wages if they are time workers, and from 80 to 100 per cent of their previous six weeks' average if they are piece workers, depending upon their ratings. Whatever they are worth on their new jobs is charged to operating expense, the remainder coming from the fund.

The company retains the right to discharge. If, in long-continued depressions, discharge becomes necessary as a last resort, the employee is given two weeks' notice or its pay equivalent. The fund to date totals approximately $150,000. Disbursements since 1920 have been about $75,000. In comparison with the annual payroll figures, the amounts paid out in any one year have been insignificant. The drain on the unemployment fund in 1921 was more than 10 times greater than in any year before or since; yet in 1921 the total sum taken from the fund was about 0.7 per cent of the annual payroll.

The Crompton & Knowles Loom Works, Worcester, Mass., has also used research investigations to improve employment conditions. As to the general results of its research work in relation to new and improved products, as well as in relation to the skill and stability of its working force, it is interesting to note that, if the company were manufacturing only those products made 10 years ago, its scale of operations would be lower.

The Bridgeport Brass Co., Bridgeport, Conn., has a policy of keeping employees informed of the operation of the business through a joint plant committee. The Sullivan Machinery Co., Claremont, N. H., maker of mining and quarrying machines, has for years used research to improve its product, to better its sales methods and to maintain a competent personnel. The General Electric Co., West Lynn, Mass., has for years maintained a research department of employment. Labor troubles and employment are skillfully handled at this plant.

The Graton & Knight Co., Worcester, Mass., tanner and belt manufacturer, found the possibilities of the harness industry as an outlet for leather scrap limited. The popularity of dogs was increasing; 100 unemployed leather stitchers were taken and an excellent business in dog collars, leashes, etc., was developed.

Tariff Changes Likely To Be Moderate

Metal Schedule Alterations in New Bill Will Relate Mostly to Reclassifications—American Valuation Probably Doomed

BY L. W. MOFFETT

WASHINGTON, April 9. — Rate changes in the metal schedule of the Fordney-McCumber tariff act will be few and moderate, on the whole, if it is enacted into law as finally approved by the majority members of the House Committee on Ways and Means. Except for a paragraph concerning machinery classification and one or two others, the entire schedule has been passed upon by the majority members. They are understood to have approved it virtually in the form in which it was revised by the subcommittee of which Representative Bacharach of New Jersey is chairman.

It is reported that considerable debate took place over some of the raw materials, particularly manganese ore, before the action of the subcommittee was approved. It is not known definitely what the subcommittee did regarding manganese ore, but the prevailing view is that the present rate of 1c. per lb. of contained manganese at least was not increased.

Most of the changes in the metal schedule are reported to relate to reclassification. It also has been indicated that where rate changes have been made they have not taken the direction of general upward revision so much as of adjusting relationships of values and establishing compensatory duties. Careful study has been given this subject by experts from the Tariff Commission. It is perhaps true that the House Ways and Means Committee is relying to a greater extent than ever before on advice from administrative branches of the Government in making the new tariff law, or "readjusting" the present law, as some members prefer to term the program.

With respect to the metal schedule, it has been found that, while imports under the present law are small when measured against domestic production, certain classes of some products have entered the country to such a degree as to affect the domestic industry producing competing lines. In such cases, it is said, there have been some changes in rates, but they have been confined to a portion of the affected paragraphs, covering only those classes which have been imported to the point of affecting domestic producers to a noticeable extent. Under this system it is said that products within a certain price range which have not been imported in substantial degree will undergo no change in rates, while similar products within a price range which have been imported in relatively sizable quantities will undergo some revision. Thus, it has been said, changes in the metal schedule have taken on the character of "refinement" rather than "revision."

Foreign Valuation May Be Continued

Granting that the program as prepared by the House Committee on Ways and Means is finally adopted in the revised act, it seems a foregone conclusion that foreign valuation will be continued as the basis of fixing duties. The drive for American valuation appears to have been definitely defeated so far as the House committee is concerned, and it is reasonable to believe the committee's view on this subject is that of Congress as a whole and presumably that of President Hoover. No one can speak for the President, but it is considered doubtful that he is in favor of a change in the basis of valuation at this time. The iron and steel industry sought the American valuation, as did a number of other industries, but even some of those who are sympathetically inclined toward it in principle say that the change would be so sweeping that it would take months of work to adjust the new program to such a basis. It is said that experts in the iron and steel industry attempted to apply this basis to the metal schedule and found that it was unworkable. It raised any number of questions which originally did not occur even to close students of the subject.

Flexible Provision Under Consideration

The flexible provision is being given much thought by the House committee. There is sentiment in Congress for its repeal, a great deal of it coming from Democratic sources. Nevertheless, it is likely that it will be given enlarged scope. One plan is to revise it so that the Tariff Commission can complete inquiries much more quickly than is now possible. Some are hopeful that actual changes in rates under the proposed revised plan can be made in 90 days. Even 60 days has been suggested, but the opinion prevails that this is too short a time to expect the commission to complete its investigations, prepare reports and submit them to the President, to be followed by a proclamation of the chief executive. Under the provision as it now stands, it has taken one or two years and in some instances longer to complete an investigation and for the President to act. The greatest stumbling block has been the making of studies abroad, in the course of which books of foreign manufacturers were inspected, often to the irritation of the foreign countries and their manufacturers. The new plan is understood to do away with trips abroad of Tariff Commission experts. Instead, values of competing imported products would be ascertained largely from invoices. There is some talk of empowering the President to transfer products from or to the free list.

Bill May Not Be Ready Before April 20

Indications are that the tariff bill will not be ready for introduction in the House before April 20. Whether tariff or farm relief legislation will be taken up first remains to be seen. The question may not be determined until Congress, which meets in special session on April 15, receives the President's message. His message also is expected to be a guide as to the character of both kinds of legislation. In his inaugural address he declared for "limited" revision and assuredly the present trend is entirely in that direction, except that possibly rates in the agricultural schedule may be generally and sharply advanced.

Usually the Senate Committee on Finance has greatly changed a tariff bill after receiving it from the House. But consideration is being given by the Senate committee to dispensing with hearings entirely. This departure, however, would be so unusual that doubt exists that the Finance committee will resort to it. It is known that many who appealed at hearings before the House Committee on Ways and Means have practically given up hope of having their requests granted and are depending upon taking their case to the Finance committee. So, if the latter should forego hearings these interests would be greatly disappointed.

Falcon Tin Plate Plant Sold to Scrap Dealer

The plant of the Falcon Tin Plate Co., formerly known as the Carnahan Tin Plate Co., at Canton, Ohio, has been sold at sheriff's sale to the Kulka Iron & Metal Co., scrap dealer, Alliance, Ohio. The sale included buildings, land and equipment. The price paid was $50,000, which was two-thirds of the appraised value. L. P. Kulka, head of the scrap company, is undecided as to the disposition to be made of the property. The plant was built in 1900 and had an annual capacity of 720,000 base boxes of tin plate.

More Activity in British Steel Mills

Pig Iron Getting Scarce and Coke Is Higher—Germans Protest at Reparations Deliveries—Japanese Making More Steel

(*By Cable*)

LONDON, ENGLAND, April 8.

PIG iron demand is being maintained and makers are unable to satisfy all of the requirements of buyers, as steel plants associated with furnaces are absorbing the bulk of the Cleveland output.

Coke prices are higher, Durham ovens quoting £1 ($4.85) per ton, and in consequence pig iron producers are reluctant to increase production. Cleveland prices are unchanged, but sales for forward shipment have been made at £3 8s. 6d. ($16.60) per ton for No. 3 foundry.

Hematite prices are firm, with producers selling only for forward delivery.

Steel works are more active, but plate mills are still in need of orders, although export demand is improving and mills expect some good business. Less Continental steel is now being bought, as prices are high and deliveries extended, but shipments on old contracts are arriving more freely with Continental waterways traffic normal.

Welsh tin plate bar makers have sold heavily at £6 6s. 3d. ($30.61) per ton and are disinclined to quote for forward delivery, as increased costs are expected in the second half.

Welsh tin plate activity has continued and with most mills sold to the end of June, some are asking 19s. ($4.60) per base box for second half delivery. Eastern markets have placed about 500,000 boxes of oil can tin plate.

Galvanized and black sheets are quiet generally.

The London, Midland & Scottish Railway is placing Derby and Horwich workers on short time, involving 7000 men.

Czechoslovakian output in January was 137,000 tons of pig iron and 175,000 tons of steel ingots. The Saar production in February was 147,000 metric tons of pig iron, 161,000 tons of raw steel and 117,000 tons of rolled products. There were 26 Saar furnaces in blast on March 1.

British Prices Stiffen as Deliveries Lengthen

LONDON, ENGLAND, March 28.—The market for iron and steel has been dominated by the raw material situation, continually increasing costs of both ore and fuel being reflected in higher prices for pig iron and manufactured products. Consumers, realizing that any further revision of prices is not likely to be downward, have been buying on a good scale. For the first time in a number of years, melters of pig iron have contracted for delivery for six to nine months in advance, and some orders have been booked for delivery up to the end of the year and beyond.

Makers are naturally cautious and in the Cleveland district a premium of 1s. 6d. (36c.) per ton is asked for second half delivery of foundry and forge grades. Prices are strong on East Coast hematite, and so far this month 10,000 tons have been shipped to Italy, with more to follow. Competition from Continental pig iron sellers is no longer encountered in the domestic market, and makers are seriously considering blowing in more furnaces. The fuel situation, however, is likely to be a deterring factor.

Production of semi-finished materials are well engaged, as Continental material, while still to some extent competitive, is not obtainable except for extended delivery. Prices are decidedly firm, with the tendency upward.

Mills rolling finished steel products have considerable unfilled tonnage. Mills rolling heavy plates and shapes are well engaged on shipbuilding orders, mainly for domestic yards, but export demand is increasing and some sizable tonnages for Canada and the Far East have been booked by the steel makers' committee. Plants rolling small bars and sections are well supplied with orders and, in some cases, cannot promise earlier than three months' delivery. Sheet mills have not experienced a strong de-

British and Continental European prices per gross ton, except where otherwise stated, f.o.b. makers' works with American equivalent figured at $4.85 per £ as follows:

Durham coke, del'd	£1	0s.			$4.85	
Bilbao Rubio ore*	1	3	to £1	3½s.	6.18 to	$6.30
Cleveland No. 1 foundry	3	9½			16.85	
Cleveland No. 3 foundry	3	7			16.25	
Cleveland No. 4 foundry	3	6			16.00	
Cleveland No 4 forge	3	5½			15.88	
Cleveland basic (nom.)	3	5			15.76	
East Coast mixed	3	14½			18.06	
East Coast hematite	3	15			18.18	
Rails, 60 lb. and up	7	15	to 8	15	37.59 to	42.43
Billets	6	5	to 6	7	30.31 to	30.79
Ferromanganese	13	15			66.69	
Ferromanganese (export)	13	10	to 14	0	65.47 to	67.90
Sheet and tin plate bars, Welsh	6	6¼			30.61	
Tin plate, base box	0	18⅓	to 0	18¾	4.45 to	4.53
Black sheets, Japanese specifications	13	10			65.47	
					C. per Lb.	
Ship plates	7	12½	to 8	2½	1.66 to	1.76
Boiler plates	9	0	to 10	10	1.95 to	2.27
Tees	8	2½	to 8	12½	1.76 to	1.86
Channels	7	7½	to 7	17½	1.60 to	1.71
Beams	7	2½	to 7	12½	1.55 to	1.65
Round bars, ¾ to 3 in.	7	15	to 8	5	1.67 to	1.78
Steel hoops	9	0	to 10	0	1.95 to	2.16
Black sheets, 24 gage	10	0			2.16	
Galv. sheets, 24 gage	13	7½	to 13	10	2.90 to	2.92
Cold rolled steel strip, 20 gage (nom.)	12	0			2.64	

*Ex-ship, Tees, nominal.
(a) Nominal.

Continental Prices All F.O.B. Channel Ports

(Per Metric Ton)

Foundry pig iron (a):						
Belgium	£3	8s.	to £3	10s.	$16.49 to	$16.97
France	3	8	to 3	10	16.49 to	16.97
Luxemburg	3	8	to 3	10	16.49 to	16.97
Basic pig iron (a):						
Belgium	3	6			16.00	
France	3	6			16.00	
Luxemburg	3	6			16.00	
Coke	0	18			4.37	
Billets:						
Belgium	5	6½			25.82	
France	5	6½			25.82	
Merchant bars:					C. per Lb.	
Belgium	6	3	to 6	5	1.34 to	1.36
France	6	3	to 6	5	1.34 to	1.36
Luxemburg	6	3	to 6	5	1.34 to	1.36
Joists (beams):						
Belgium	5	4	to 5	5	1.14 to	1.15
France	5	4	to 5	5	1.14 to	1.15
Luxemburg	5	4	to 5	5	1.14 to	1.15
Angles:						
Belgium	6	0	to 6	2	1.31 to	1.32
¼-in. plate:						
Belgium (a)	6	6	to 6	6½	1.38 to	1.40
Germany (a)	6	6	to 6	6½	1.38 to	1.40
⅜-in. ship plate:						
Belgium	6	5½			1.37	
Luxemburg	6	5½			1.37	
Sheets, heavy:						
Belgium	6	1			1.31	
Germany	6	1			1.31	

mand, but are, nevertheless, moderately well booked with orders.

There has been a rapid revival of demand for Welsh tin plate. Following a period of comparative inactivity foreign consumers, apparently influenced by the adoption of a quota system by the mills, have been making large purchases. Users, in some cases, have bought for shipment up to the end of the year.

Protest Against Reparations Paid by German Railroads

HAMBURG, GERMANY, March 29.—German locomotive and car builders and rail mills are vigorously protesting against the present system of reparations payments by the German Railroads Corporation, under which monthly instalments amount to 50,000,000 to 60,000,000 m. ($11,850,000 to $14,220,000). They claim that the locomotive industry, which will receive no orders this year from the German railroads, is facing financial collapse because of this absorption of the railroads' surplus.

Necessary replacements of permanent way material are also prevented. Instead of a renewal of 3000 km. of track annually, the pre-war program of the railroads, only 2000 km. have been annually renewed since 1920. With the mileage of unreplaced track increasing yearly, so that track that should be replaced now totals about 7000 km., the railroads are in a dangerous condition. German manufacturers contend that the money being used for reparations payments should be applied to replacements of track, locomotives and cars, after which reparations payments could be resumed.

Large Japanese Steel Output But Poor Profits

WASHINGTON, April 6.—Production of steel by Japanese mills is well in excess of 1,500,000 metric tons annually, a figure approximately double that of 1920, according to an analysis by the Department of Commerce, in which it is stated that one of the most significant developments in Japan's recent economic history has been the growth of its steel industry. Japanese plants are being enlarged and improved, an indication that producers believe that natural obstacles can be overcome and that continuance of Government support can be relied on.

Most of the iron and steel companies operating, it was pointed out, owe their origin to the industrial stimulation provided by the war, when prices of products rose to fantastic heights. The financial status of Japan's steel industry is said never to have been in a really satisfactory position since 1920. In 1926 private steel companies with a capital investment around $115,000,000 showed a profit of less than $5,000,000. Only two companies showed profits of 5 per cent, the report said, and both of these were compelled to undergo radical readjustment programs in 1927. At the beginning of the current year, however, prospects for the industry appeared brighter than at any time since the close of the war.

New Krupp Furnace Ready This Month

HAMBURG, GERMANY, March 23.—A new blast furnace, being constructed by Friedrich Krupp A. G., near Borbeck, will be ready to be lighted in April, and a new foundry at Borbeck will begin operations some time in May. With the new furnace in blast, three smaller furnaces will be dismantled.

German Production of Armco Iron Rising

DÜSSELDORF, GERMANY, March 30.—Production of Armco iron by the Vereinigte Stahlwerke A. G., under license from the American Rolling Mill Co., has increased from 300 tons a month, six months ago, to 500 tons a month. Demand is increasing, and further expansion of production will be necessary.

British Bolt Standards Used by German Makers

HAMBURG, GERMANY, March 29.—Most German bolt and nut makers have decided to introduce British engineers' standards for the diameter and shape of bolt heads shipped for export. The German bolts have differed in head thickness on hexagon bolts and in the head shape on carriage bolts. Nuts were also slightly thinner. The change to British standards was made in the belief that it would stimulate business with Canada and other British dominions and colonies. Recently German bolt makers have booked some sizable orders from the Philippines for set and cap screws and hexagonal bolts and nuts.

German Sales of Wire Nails to Britain Increasing

HAMBURG, GERMANY, March 29.—German manufacturers of wire nails believe that the British Merchandise Marking Act, effective March 20, 1928, has stimulated sales of German nails to the United Kingdom. Of total British imports of 65,470 tons in 1928—about 1000 tons more than in the previous year—Germany furnished 16,600 tons, compared with 9790 tons in 1927. On the other hand, Belgian exports to England last year were 4700 tons less than in 1927 and French shipments 1000 tons less, although in the case of Belgian nails prices were about 4s. (97c.) per ton below the German c.i.f. quotations. German makers attribute the gain in sales largely to the fact that, under the Merchandise Marking Act, all kegs or bags must be marked with the country of origin, and that British consumers can select the nails which they believe are uniformly of highest quality.

German Exporters Sell Polish Bamboo Steel

HAMBURG, GERMANY, March 23.—Exporters here have recently been successful in securing most of the Chinese business in bamboo steel, which is largely supplied by Polish works in Upper Silesia, formerly German owned. The exporters quote prices in Shanghai taels, delivered into the warehouses of Chinese merchants. In the first two months of this year German exporters booked most of this bamboo steel business, quoting an average price of 4.2 taels ($2.60) per picul, or 1.95c. per lb., delivered.

Reparations Deliveries Reach Record

HAMBURG, GERMANY, March 23.—Exports of steel products on reparations account reached a new record in February, when the total value of all reparations shipments was 120 per cent greater than a year ago. The totals were as follows: iron and steel products, 5,100,000 m. ($1,208,700); hardware, 1,800,000 m. ($426,600); electrical equipment, 4,100,000 m. ($971,700); and other machinery, 5,200,000 m. ($1,232,400). The principal buyers of reparations products were France and the French colonies, Italy and Jugoslavia. Among the important reparations deliveries were rails and various other steel products, Diesel engines, dynamos and typewriters.

Single-Strand German Barbed Wire Exports Gain

HAMBURG, GERMANY, March 29.—Export sales of single-strand barbed wire, introduced by German mills about three years ago, are increasing rapidly. Demand from South Africa has been particularly good for some time, and recently exports to Argentina and Brazil have been in good volume. Single-strand barbed wire is still about 20 per cent higher in price per ton than double-strand, but, as it is much lighter per yard, the buyer is said to save about one-third in the price for the same mileage.

Russia Buys German Bolt and Nut Machinery

HAMBURG, GERMANY, March 23.—The equipment for a bolt and nut mill at Stalingrad, Russia, to cost about $1,250,000, has been bought by the U. S. S. R. in Germany. The Russian Government has also signed contracts with 60 German engineers, guaranteeing them high wages and personal security. They will be employed in various Russian iron and steel works.

Direct vs. Dealer Selling Discussed

Management Executives Consider This and Other Problems of Industrial Distribution in Cincinnati Conference

PROBLEMS of industrial selling were discussed at a round table meeting in connection with the conference of the Marketing Executives' Division of the American Management Association at the Hotel Gibson, Cincinnati, April 3 and 4. The extent to which the return-on-investment sales argument is being used, distribution tendencies in industrial marketing, the increasing importance of the engineering specialist, methods of equipment makers in calculating demand for their products, and ways and means of preparing to meet the exigencies of a buyers' market were among the subjects analyzed by a representative group of executives from various industries.

That many companies are using the "balance sheet method" of selling equipment was emphasized by one of the speakers, who stressed the fact that the sales representative who possesses an intimate knowledge of shop costs and of other production expenses of the customer is better able to sell a new tool installation than the salesman who relies on "high pressure" methods. Another member testified that his company's business has been built largely on the policy of showing the user of his product the savings in dollars and cents which can be made by purchasing his equipment. He revealed that detailed investigations had proved that only about 15 per cent of the manufacturers utilizing materials-handling devices are able to determine accurately their handling costs.

How Soon Should Equipment Pay for Itself?

The question, "What is a reasonable time for new equipment to pay for itself?" brought out various opinions. In machine tools, one member thought that from two to four years probably would be the average time, although certain industries, such as automobile manufacture, make more exacting requirements. Another member suggested that the average is nearer two years than four. However, a machine tool user declared that any formula for this question must be flexible. The time depends upon the special conditions that confront the individual customer. Under certain circumstances a company might be justified in buying equipment which would not pay for itself in less than eight years, but, on the other hand, the purchase of tools sometimes should be based on the idea that they would save their purchase price in six months.

The fact was brought out that the expectations of machine tool customers sometimes are ridiculous, especially in cases where the high executives of a company tell a shop superintendent or a shop foreman that he may buy a certain tool if the manufacturer can prove that it will save its cost in a period extending over only a few months.

Pros and Cons of Direct Selling

Discussion of distribution tendencies resolved itself into the merits of the dealer system as against direct selling. Those supporting the marketing of equipment through dealers declared that this policy serves the convenience of the consumer, who can get information from a dealer's salesman about a number of tools. Furthermore, the personal contacts established by the dealer's salesmen are of great value to the manufacturer in gaining the customer's good will. Moreover, by reason of their frequent calls upon customers and prospects, these salesmen often are the first to hear of a new development for which new equipment is required and therefore have an advantage over their competitors.

The most frequent and potent argument in favor of direct selling is the high degree of technical knowledge which the salesmen of many products must possess. Wherever the nature of the product demands such knowledge on the part of the salesman, direct selling has proved preferable, some members said.

In summarizing this topic, one of the members said that in the matter of the method of selling, as in that of the time in which equipment should be expected to pay for itself, no set rule can be applied. The selling policy of the equipment builder can be decided only after all factors related to his individual problems have been carefully considered. However, many products are becoming more highly technical and many customers, particularly the mass production shops, are going into the small items of cost more intensively than ever before. Intelligent management of these shops is insisting upon more careful consideration of all factors relating to production.

The burden at present resting upon the dealer is to employ the type of salesmanship which rises in response to these new technical developments. Unless the dealer recognizes this fact and has salesmen who understand thoroughly the product they are selling and its application to the product made by its users, his position in the distribution process will become less secure.

Members agreed that the engineering specialist is increasing in importance and that the tendency toward the use of more technical knowledge in marketing equipment is further emphasizing his influence.

The meeting was held under the leadership of Frederick B. Heitkamp, sales promotion manager, Cincinnati Milling Machine Co., Cincinnati.

United States Joins Rail Cartel

Official Adherence Reported in Europe—Export Quota of 190,000 Tons Mentioned—Penalties Increased

HAMBURG, GERMANY, March 23.—American rail mills definitely became members of the European Rail Makers' Association at the recent meeting of that body in Brussels, March 16. *L'Usine*, Paris, states that "the Americans have declared that they have accepted official participation in 'Erma' from this time forward to tighten the bonds which unite them with the rail cartel."

An early change in the name of the cartel to International Rail Makers' Association is expected, following American adherence, although it brings no important change in the international situation, as American mills have been represented since the formation of the cartel through Great Britain, which controlled both the British and American quotas. It is understood that the American mills have received an export allotment of 185,000 to 190,000 tons. With American makers in the rail cartel, it now includes all the important world producers of rails. The non-members are Sweden, Poland, Italy and Spain, but they are of little importance as exporters, Poland having shipped only about 7000 tons of rails in 1928 and Sweden, Italy and Spain together accounting for a total of 280 tons.

While details of the latest meeting of the rail association are not yet available, it appears that German deliveries on reparations account are not to be charged against the German allotment, except when the quantity involved exceeds 30,000 tons a year. The penalty for shipments in excess of quota has been increased from 5s. to 10s. ($1.21 to $2.42) per ton for the first 10,000 tons and from a flat rate of 2s. 6d. (60c.) per ton additional for each succeeding 10,000 tons to a rising scale, which reaches £1 ($4.85) per ton for excessive overshipments.

British mills have received concessions in the quota for deliveries of rails to their own colonies, and the German members have been conceded the right to withdraw from membership without giving preliminary notice. Although there are no present indications that Germany will withdraw from the cartel, it is known that the heads of most of the large German steel mills have expressed opposition to the cartel. German withdrawal would considerably reduce the effectiveness of the association, as Germany produced 38.2 per cent of the total European rail output reported for last year.

This Issue in Brief

Saves $3,000 yearly by power saved on a single operation through discoveries made by use of portable recording wattmeter. Electrical engineer declares important savings can be made by making input power tests on all electric-current consuming equipment.—Page 1019.

* * *

Reduces rejections to 1 per cent by using a special putty to fill holes in castings to be enameled. Enameling plant putties the castings after they leave the storage drier, on the way to spray booths.—Page 1016.

* * *

Jobbing foundries can cut costs by installing individual molder sand hoppers, automatically filled by scraper-type distributing conveyor. Molder is relieved of the necessity of watching the amount of sand in storage bin. Positive flow of sand is assured by having the hopper larger at the discharge end.—Page 1021.

* * *

Manganese content of steel in last ingots poured is much lower than in first ingots from same ladle, tests reveal. Phosphorus also drops sharply, while sulphur rises.—Page 1020.

* * *

Pays temporarily laid-off employees out of unemployment relief fund. Workers with dependents receive 80 per cent of wages, and others 60 per cent, during lay-off period. The fund is accumulated out of profits covering a five-year period.—Page 1026.

* * *

Accelerated, intensified road test is given by shock test machine. Car is mounted on eight rolls, two under each wheel. Metal cleats on the roll faces at irregular intervals simulate ruts and bumps of worst roads. The "wrack and pound" test reveals quickly where strengthening is needed.—Page 1010.

Finished stampings must come from the presses without scoring, scratches or low spots. Even touching-up practices are taboo in automobile-body manufacture. Constant improvement in body sheets makes it difficult to develop a definite standard for various grades.—Page 1006.

* * *

Automobiles scrapped in 1928 equal 70 per cent of new cars put into domestic use. Estimates reveal that 2,367,000 cars were scrapped in 1928, while 3,402,000 were put into use in this country. —Page 1008.

* * *

Sentiment against super-production machine tools is developing abroad, says machine tool builder, after extensive foreign visit. Machines which are too productive for the demands of the market are standing idle or are being operated part time.—Page 1012.

* * *

Cooperative effort could easily raise fabricated steel consumption to 5,000,000 tons annually, association chief believes. Development of present markets and promoting new uses, with proper advertising program, would assure attainment of goal.—Page 1025.

* * *

"Don't 'run in' bronze bearings," says bearing manufacturer. Condemns practice of driving a ball head through a bushing. Best practice is to bore to within a few thousandths, finishing to exact size by means of a rapidly revolving diamond cutter.—Page 1015.

* * *

Below-zero cold room provides valuable data on cold weather starting and lubrication performance. Temperatures as low as 60 deg. below zero can be produced. Automotive engineers, clothed in Arctic garments, work in relays. —Page 1009.

Pirating of American machine tool designs by foreign builders is declining, says investigator. Copying still exists but is confined to obsolete models. Foreign builders find they cannot copy a first-class machine and sell it at a price much lower than the original.—Page 1014.

* * *

Avoids costly overloading of motors by frequent use of recording wattmeter. Sources of poor power factor in Ohio plant have been traced down by load tests, and in several instances the average plant power factor has been markedly improved.—Page 1020.

* * *

Unprotected molds conveyed without damage on gravity rollers. Projecting contacts, i.e., cleats of the board proper, extend about ½ in., making a separation of 1 in. between the molds, and obviating the need for flasks.—Page 1021.

* * *

Upright trip hammer has the advantage of delivering a vertical blow to the metal, whereas the trip hammer with horizontal helve delivers a blow on the arc of the circle of which the helve length is the radius.—Page 1003.

* * *

Prevents corrosion between sand blasting and enamel spraying operations by keeping parts in an electrically-heated drier, at a temperature of 80 deg. Fahr.—Page 1016.

* * *

Foreign market for American machine tools has improved but prospects are not wholly promising. Pre-war sales volume will not be reached, competition from European builders is becoming stronger, credit accommodations are inadequate, and average prices of foreign machines are about 30 to 50 per cent lower, says American machine tool builder after foreign trip.—Page 1013.

A. I. FINDLEY
Editor

THE IRON AGE

W. W. MACON
Managing Editor

ESTABLISHED 1855

More Light on Steel Outlets

COMING in advance of the American Iron and Steel Institute's detailed statistics for the entire industry, the Steel Corporation's annual report gives a fair gage of the line-up of rolled and finished steel products in 1928. It shows that the corporation produced a round million tons more of such products last year than in 1927, or 13,972,388 tons against 12,979,282 tons, a gain of 7.7 per cent.

It appears probable that the entire steel industry produced something like 5,000,000 tons more of finished products in 1928 than in 1927. Bars and sheets contributed about three-fourths of the corporation's increase and presumably that proportion would apply to the industry as a whole.

A large factor in last year's increased consumption of steel, as is well known, was the automobile industry, which buys chiefly sheets and bars. There was also, no doubt, a gain in 1928 in the use of steel in new ways, such gain being especially noteworthy in sheets and strips. THE IRON AGE'S analysis of the distribution of the 1928 product of the steel mills, on pages 7-9 of the issue of Jan. 3, 1929, showed the predominance of automobile consumption in the 1928 increase in bars and sheets. It also showed an increase of about 1,500,000 tons in the "miscellaneous" uses of steel—those apart from the 21 outlets represented in THE IRON AGE classification.

What were the new outlets into which no inconsiderable tonnage of the 1928 output of the mills found its way? The records of the sheet and strip manufacturers' association at Cleveland could throw some light on the question, for the manufacturers of sheets and strips, more than those in any other finished steel lines, have definitely worked to find new uses for their product.

As a whole, however, the steel industry, with its vast resources in money and men, has not been as active in exploratory work as manufacturers in some other lines: cement, copper, lumber and brick, for example. The American Iron and Steel Institute gathers statistics of steel production that for accuracy, informative detail and promptness of publication are not equaled in any producing country in Europe. But in respect to steel distribution the available information is far short of what it should be. Several years ago Mr. Clarke presented to the directors of the institute a plan for the collection of distribution statistics by sales departments of the steel companies. The classification he adopted after painstaking research would have made it possible to know year by year the fluctuations in consumption in different fields, so that sales effort could be directed in the light of fairly definite knowledge as to the lines of consumption which were least resistant and those which called for closer cultivation.

In view of the large and increasing demands upon them for statistical information, on Government and other accounts, and the great difficulty sales departments would have in tracing the final destination of material sold, the directors decided to postpone the undertaking.

We believe the time is ripe for taking up this work now. No outlay by the steel companies could yield larger ultimate returns than the expenditure involved in thus preparing the way for a forward movement to increase the consumption of steel. Many producers have made gratifying response to THE IRON AGE canvass at the end of each year, to show where steel of the different forms went in the twelve-month. Good as the results have been, they can be made of far greater value, with the cooperation of all producers and with a more detailed analysis of consuming lines.

In his address before the American Iron and Steel Institute last October, President Schwab pointed out that to increase the uses of their products was one of the great needs and should be one of the chief aims of the associated manufacturers of steel. To that end cooperative market research and thorough knowledge of present and potential outlets for steel are of first importance. United effort of this character, to repeat what THE IRON AGE said editorially a week ago, is the best insurance against profitless competition.

Steel Demand and Money Rates

THE debate about share values, speculation, money rates and what, if anything, the Federal Reserve Board ought to do about it has many angles. The angle that concerns the demand for steel in this period of high money rates is not an inconsequential one, for there is much in the adage that the proof of the pudding is in the eating thereof. Without attempting to outline the precise reasons apparent for the attitude, it is a fact that in the last few weeks various steel producers have expressed themselves as out of sympathy with actions of the Federal Reserve Board calculated to "curb stock speculation."

Plain facts may, however, be adduced to indicate that the course of steel, which is largely a construction material, has not been adversely affected by high money rates; for, if it were, then without high money rates the steel mills would be quite swamped with orders and all trade would be more or less disorganized.

One must not get his notions about the course of

money rates from the volume of talk heard; if he did, the notion would be that money is several dozen times as tight as it was a few months ago. The fact is that money rates, after being approximately stationary in 1927, advanced sharply and quite uniformly during the first three quarters of 1928 and have been approximately stationary since then. The comparison is much the same whether one takes commercial paper, acceptances or time loans. Call money, of course, has had very irregular fluctuations.

We should, then, expect steel demand to have been adversely affected beginning say at the middle of last year, and to have suffered particularly just of late. What we find is that, while in the three preceding years second-half production of steel averaged 9 per cent under first-half output, in 1928 second-half production gained about 2 per cent. That is, the second-half production was fully 10 per cent above what would naturally be expected from the course of affairs in the first half, with allowance for seasonal variation indicated by precedent. What we find further is that steel production this year to date has run about 10 per cent above that in the same period of last year, although that production was in its time record high.

There may be a connection between profits in the stock market and the demand for automobiles, but, if so, that would not work out in any large way as to total demand for steel. The annual finding of THE IRON AGE had it that not more than 18 per cent of last year's steel production went into the automotive industry, and a prorating according to respective outputs of steel ingots and automobiles shows that in the first quarter of last year the ratio was 16 per cent. A further computation indicates that the ratio in the first quarter of this year was between 21 and 22 per cent. There is left an increase in all other steel demand this year as compared with the same period of last year.

There are other steel buying activities which can be studied. Last week the placing of a large volume of line pipe was reported, and that is something that must be financed. About 45,000 freight cars have been ordered thus far this year, against only 60,000 to 75,000 cars in each of the last three full calendar years. These cars also involve capital in some form.

Also we have fabricated structural steel work. Lettings reported in our columns last week totaled 84,300 tons, the largest we ever recorded for a week. For the last five weeks the average has been 56,828 tons, which is 57 per cent over our weekly average in 1928 and 72 per cent above our average in 1927. For 13 weeks of this year the weekly average is 42,524 tons, which is 17 per cent over last year and 29 per cent over 1927.

Certainly the steel industry can find no fault with these conditions.

INTERPLANT safety contests should be encouraged. They have been conducive to reductions in both the number and severity of industrial accidents. The National Safety Council has taken a leading place in the movement. Some months ago, records were compiled for ten cities in which there was a total of 510 plants employing 340,000 workers. The average number of accidents per one million man-hours was 19.5, ranging from 7.9 in Worcester to 37.5 in Louisville. The average severity rate for the ten cities, measured by the number of days lost per one thousand man-hours, was 0.99.

Copper Past the Peak

READERS of these pages will remember more than one recent occasion when the copper market has been discussed, and the view expressed that the sky-rocketing price has been unwarranted by any economic factor and unexplainable except by a buyer's panic and a shrewder and more harmonious policy among the producers and sellers. But like all other sky-rockets, it finally must turn down. On March 22 the delivered price was marked up one cent a pound to 24 cents, where it remained until April 9, despite slight sales. During this interval buyers apparently realized they were sufficiently well provided with metal for summer delivery, and some of the selling agencies grew tired of waiting for purchasers to appear. The bad break in prices occurring as this is written may represent a turning of the tables, with sellers panicky and buyers shrewder.

Yet the fundamental situation is unchanged. It has been hard to imagine any synchronization of enlarged sales to the ultimate American consumption which could cause a jump from about 230,000 tons for the first quarter of 1928 to 300,000 tons for the first quarter of 1929. Other metal-working industries experienced no like expansion, nor did the copper business of the rest of the world show an equivalent spurt. The most plausible explanation was that buyers generally abandoned the "hand-to-mouth" principle of buying, and fabricating plants, warehouses, jobbers and large consumers started to accumulate moderate reserve stocks. Greatly increased consumption of the latest quarter is therefore more apparent than real.

Now that the fabricating plants, warehouses, jobbers and large consumers have become satiated with the sight of some copper, brass and bronze on their shelves, and of the fancy prices appearing on their invoices, they will have an opportunity to study and digest the real facts of the situation, which are these (as ably presented by A. B. Parsons in the current issue of *Engineering and Mining Journal*):

The world consumption is advancing about 6 per cent a year, as follows:

Year	Estimated Consumption (Tons)
1929	1,900,000
1930	2,010,000
1931	2,130,000
1932	2,260,000
1933	2,400,000

The mines of the world can produce in 1929 2,291,000 tons of copper; enormous new deposits are about to become productive; present smelter capacity is ample; refinery capacity, if not ample, is adequate and steadily enlarging.

Of the above copper, 86 per cent is produced at 11 cents or less a pound; and the highest cost ("marginal cost") is about 17 cents.

An economist would say that the difference between the marginal cost, 17 cents, and the nominal price of the last three weeks, 24 cents, is pure velvet. In fact, he would have difficulty in understanding the 24-cent price at all. How soon it will drop to 17 cents depends upon the psychology of the market, which in

turn is related to the real or fancied pressure to sell and the real or fancied necessity to lay in forward supplies, rather than to a calm consideration of the productive capacity of the world industry.

More Steel Per Freight Car

NOT since 1924 have domestic railroads bought more than 100,000 freight cars in one year. Last year the total was only 51,200, and the orders were so scattered and intermittent that car-building shops found difficulty in scheduling their working programs on an efficient basis. In the first three months of this year the railroads bunched their orders so that the total for the quarter is nearly equal to the contracts closed during all of 1928.

Offhand, this high record of orders might seem to indicate a boom year in the building of new railroad equipment, but the car manufacturers themselves apparently have no such expectation. In fact, it is believed that the bulk of the car purchasing has already been done, and predictions are for an entire year's business of about 75,000 cars, which, though in excess of any annual total since 1925, when the figure was 92,816, would be considerably below the capacity of car shops to produce.

While the trend of railroad equipment buying in the past few years has been toward a minimum number of new units—a situation naturally not to the liking of the car companies—the wider adoption of steel construction has given the steel industry an increasingly larger share in the furnishing of car-building materials.

In 1917, when the war checked equipment buying, Class 1 railroads owned a total of 2,301,947 cars, of which 595,536 were of steel, 802,431 had steel underframes and 903,980 were of wood. In 1927—the last year for which such figures are available—the number of steel cars was 799,820, those with steel underframes totaled 1,086,982, and wooden cars had declined to 437,997. Yet the total of all cars owned in 1927, at 2,324,799, showed less than a 1 per cent gain since 1917. In other words, the preponderance of steel and steel underframe cars over wood had grown nearly 1,000,000 in the period from 1917 to 1927.

Agitation recently carried on in railroad circles in favor of scrapping of old cars of light construction, particularly box cars, and supplanting them with heavy cars of larger loading capacities, points to an increasing participation by the steel industry in the supplying of materials for cars. In a recent address to the Western Railway Club at Chicago, M. J. Gormley, chairman, Car Service Division, American Railway Association, emphasized that the constant aim of the railroads is to handle more business with fewer units of equipment. Figures, based on actual performance, were given to show that cars built to carry heavy loads have a much higher earning power than small cars. The railroads still own 282,556 box cars of 60,000-lb. capacity, the retirement of which Mr. Gormley advocated, so that they may be replaced with heavier and more economical units.

Such a program of further rehabilitation of railroad equipment forecasts at least moderate buying for some years. For the steel industry, the number of units will not be of as great importance as the total amount of steel involved. Larger cars are being built, as for example the adoption of 53-ft. lengths instead of 46 ft. for mill-type gondolas. Every such extension in size, of course, increases the amount of steel per car.

CORRESPONDENCE

College Work for Foundry Manager

To the Editor: I was particularly interested in your article suggesting a curriculum in foundry engineering for students who want to elect foundry work as their life work. I have checked over the different courses that enter into the curriculum and find that with one exception we give every one at Ohio State University, but so far, however, only two students have taken a course like this leading to foundry work.

One course that we have in our Industrial Engineering Department at this university and one that I would suggest is a course in sand testing and in synthetic compounds of sand. In other words, in addition to our regular foundry and pattern shop courses, we go very considerably into the theory of other materials used in foundry work.

Further, I think our general course in Industrial Engineering which deals with executive and management problems is of great value to the student who wants to become a foundry manager.

Incidentally, we look upon our foundry work as a very valuable training course for all students, as founding involves many fundamental factors that enter into engineering.

JOHN YOUNGER,
Professor, Department of Industrial Engineering,
Ohio State University.

Columbus, April 1.

Immigration Quotas

To the Editor: In your editorial on "Immigration as a Major Concern" (Feb. 28), you stress the importance of unemployment, among other things, as compared with restriction of immigration. Perhaps the chief reason for the importance of immigration restriction is its bearing on unemployment. In Massachusetts we receive about as many immigrants yearly as there are unemployed in the State. This is not to claim that immigration is the only cause of unemployment in Massachusetts, but it unquestionably makes a bad situation much worse.

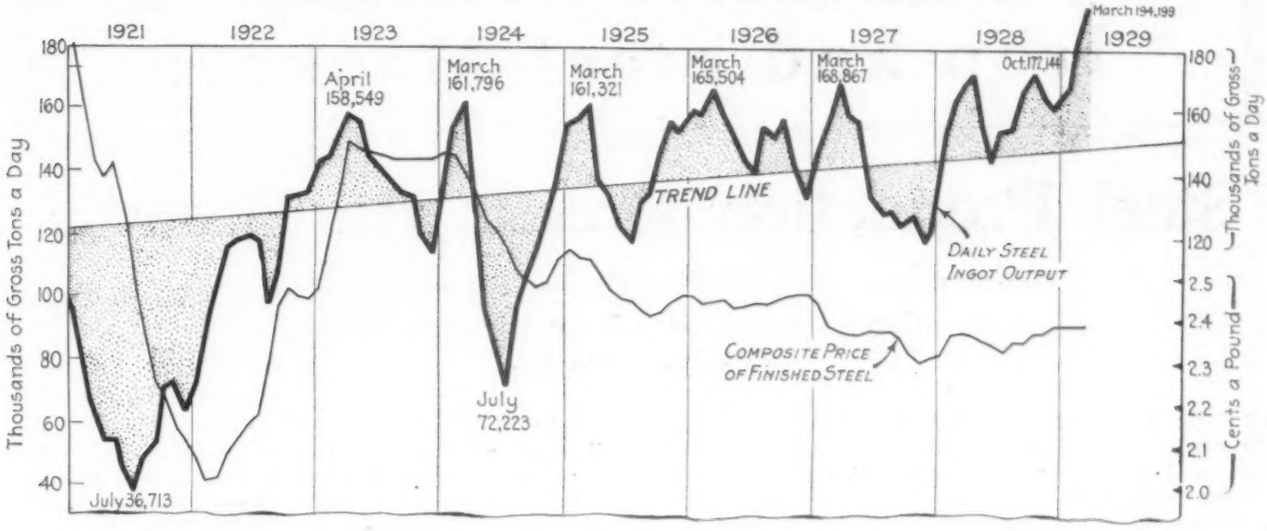
There is good reason, however, for your criticism of the handling of the immigration question in Congress. Most of the emphasis during the last session has been on National Origins versus the 1890 census. This seems to me a minor question. The question of whether we are to have large quotas for the English or for the Germans and Irish has been allowed to obscure the very much more important question as to whether we can afford large quotas at all.

EDITH R. BRADLEY.

Boston, April 2.

Schedule of the next instalments of the ***Business Analysis and Forecast****, by Dr. Lewis H. Haney, Director, New York University Bureau of Business Research, follows:* ***April 18****—Position of Iron and Steel Producers;* ***May 2****—Activity in Steel Consuming Industries.*

Ingot Production in March Was at the Highest Rate Ever Reached. The trend line shows a normal growth of about 1,013,000 tons a year. Prices in March were 3 per cent better than at midyear of 1928



Steel Ingots Break All Records

March Output Passes 5,000,000 Tons—Daily Average for First Three Months Was Higher Than for Any Single Month in Earlier Years

PRODUCTION of steel ingots in March broke all records for any month. Not only was the output above 5,000,000 tons for the first time, but the plants made the highest daily average for any month yet reached. This followed January and February production higher than ever before reached for the first and second months of any year and the quarter followed a record-breaking year in 1928.

Figures of the American Iron and Steel Institute show total production in March of 5,049,176 gross tons, based on reports from companies which made 94.68 per cent of the total 1927 output. The previous record month was March, 1927, with 4,535,272 tons; hence the new record shows a gain of over 500,000 tons.

With 26 working days, this gives 194,199 tons daily, another new record. This displaces the previous record of 179,926 tons (revised), achieved in February.

All quarterly records have been completely shattered. With 13,849,701 tons for the 90 days of January, February and March, the total has gone more than 900,000 tons beyond the previous highest quarter (last three months of 1928), when 12,926,703 tons was made. The largest earlier figure for any three consecutive months was 13,054,854 tons—the production of September, October and November, 1928.

Only two months of the past 14 (June and July of last year) have shown less than 4,000,000 tons. But only 13 months in all preceding years had reached that amount.

Open-hearth steel, with 4,183,869 tons reported and a further small amount estimated as the production of non-reporting companies, broke all monthly records. The previous maximum was 3,802,396 tons, reported for last October. Only five months, prior to 1929, showed total steel output greater than the open-hearth tonnage of last month.

Bessemer output last month was the highest since October, 1928. For the three months elapsed, open-hearth production compared with a year ago shows a gain of nearly 12 per cent, against about 3 per cent gain for Bessemer.

Electric and crucible steel ingots, no longer reported monthly by the institute, made an average daily total of 1219 tons in 1927—the last year for which data are available. A figure of some such magnitude, to allow for ingots made by the electric and crucible processes, should be added to the daily output figures given above if comparisons are to be made with earlier years, such as are shown in the diagram at the head of this page. It is significant, however, that, even without this addition, the latest figures are above all earlier ones.

PRODUCTION OF OPEN-HEARTH AND BESSEMER STEEL INGOTS
(GROSS TONS)

1928 Months	Reported by Companies Which Made 94.68 Per Cent of the Steel Ingots in 1927		Calculated Monthly Output All Companies	No. of Working Days	Approximate Daily Output All Companies
	Open-Hearth	Bessemer			
January	3,280,247	498,746	3,991,332	26	153,513
February	3,308,728	521,366	4,045,304	25	161,812
March	3,700,411	567,309	4,507,520	27	166,945
Three months	10,289,386	1,587,421	12,544,156	78	160,823
April	3,509,637	564,039	4,302,573	25	172,103
May	3,397,651	581,949	4,203,190	27	155,674
June	3,016,487	527,351	3,742,964	26	143,960
July	3,075,247	533,550	3,811,573	25	152,463
August	3,386,750	569,436	4,178,481	27	154,759
September	3,381,917	545,015	4,147,583	25	165,903
October	3,802,396	598,227	4,647,891	27	172,144
November	3,441,985	590,796	4,259,380	26	163,822
December	3,308,872	496,726	4,019,432	25	160,777
Year	40,610,308	6,594,510	49,857,223	311	160,313
1929					
January	3,694,218*	549,616	4,482,292*	27	166,011*
February	3,599,224*	489,279	4,318,233*	24	179,926*
March	4,183,869	596,691	5,049,176	26	194,199
Three months	11,477,311	1,635,586	13,849,701	77	179,866

*Revised.

Iron and Steel Markets

Steel Production Breaks All Records

Extraordinary Total for First Quarter Raises Doubts as to Duration of Present Rate—More Aggressive Selling of Southern Pig Iron

STEEL production for both March and the first quarter was so large as to raise doubts among steel makers themselves as to how long such a pace can continue. Ingot output not only established new records, but did so by much larger margins than had been expected—for March by 500,000 tons and for the quarter by 900,000 tons.

Shipments have been in keeping with mill operations; yet backlogs show little reduction and in some cases are still growing, as evidenced by further lengthening of deliveries. The order book of a leading sheet producer on April 1 was larger than at the beginning of the year, notwithstanding shipments that far exceeded those of any previous quarter. The Steel Corporation's unfilled tonnage statement for March is expected to show a gain of close to 250,000 tons.

Consumers have been unable to stock much steel, and there is no question about the size of present commitments, particularly those in automobile steels, which will carry some mills through the current quarter. However, actual shipping orders must be placed before contract tonnage can be rolled, and a turn of the market resulting in postponements of deliveries is possible, if not probable.

A slight decrease in the pressure for shipments by automobile builders, reported at some centers, is offset, at least in part, by the growing requirements of other consuming industries.

At Chicago, deliveries on plates now range from 10 to 12 weeks, and April shipments to a single consumer will exceed 75,000 tons. Total steel specifications in the Chicago district were the second largest of the year, and, if the capacity of open-hearth furnaces will permit, a new record monthly output in that area seems assured.

Mills in other producing centers are no longer falling behind in deliveries. In some products new orders and specifications are not quite equal to shipments against older commitments. Such a recession is not surprising in view of the heavy releases against contracts toward the close of the last quarter.

Of greater concern to the iron and steel trade is the flow of the products of steel to ultimate consumers. Retail sales of automobiles now passing into dealers' hands are being watched for possible adverse effects resulting from weakness in the securities markets. The caution of the automobile industry itself is manifest in its failure to show interest in its third quarter pig iron requirements.

Second quarter prices on finished steel have successfully met tests thus far encountered, except in the case of sheets. Despite the heavy order books of sheet mills, occasional concessions of $2 a ton are still reported on black and galvanized finishes, particularly the latter.

Fabricated structural steel awards of 74,000 tons follow last week's record total of 84,000 tons. Forty barges for the Inland Waterways Corporation account for 22,000 tons and a Toronto bank calls for 12,000 tons. Contemplated work includes 5700 tons for catenary bridges required in the Pennsylvania Railroad electrification program. Structural mills in the East, where construction is most active, are very busy, and for one large producer April output may exceed that of March.

Railroad equipment bookings have been augmented by orders for over 2600 cars, making a total of nearly 46,000 purchased by domestic roads since Jan. 1. The Baltimore & Ohio has entered the market for 3000 cars.

Pipe lines promise to continue to take important steel tonnages. A line from Monroe, La., to Birmingham and Atlanta, yet to be financed, will call for 250,000 tons.

Tin plate output has increased to 95 per cent of mill capacity.

The pig iron market is marked by more aggressive selling on the part of Southern producers. Alabama iron is being offered at widely separated points in the North, extending from the Missouri River to New England, and in some cases is undercutting delivered prices on competitive iron by 50c. to $1.50 a ton. The base price of $15.50, Birmingham, has been shaded 50c. a ton in extreme cases. Prices on Northern and Eastern irons are holding their own, however, with basic iron in the Valleys advancing 50c. a ton on a sale of 1000 tons. Canadian pig iron has also gone up 50c.

Steel ingot output exceeded 5,000,000 tons for the first time in March, the total of 5,049,176 tons comparing with 4,535,272 tons in March, 1927, the previous monthly record. The daily average last month, at 194,199 tons, was also the highest ever recorded. Production for the quarter, totaling 13,849,701 tons, compares with 12,926,703 tons in the last three months of 1928, which was the highest previous quarterly figure.

A break in copper from 24c. to 22c. came on Tuesday, partly as a result of extreme weakness in all nonferrous metals in London, but also because of the anxiety of some custom smelters here to sell metal rather than accumulate it at the high price level. The copper market is unsettled and a further decline is not unlikely. Large primary copper producers are still holding to the 24c. level, being well sold for the next two or three months. Tin dropped below 47c. for the first time since July, 1928. Lead has declined ½c. a lb.

THE IRON AGE composite price for pig iron has advanced from $18.29 to $18.54 a ton. The finished steel composite is unchanged at 2.412c. a lb.

A Comparison of Prices

Market Prices at Date, and One Week, One Month and One Year Previous, Advances Over Past Week in Heavy Type, Declines in Italics

Pig Iron. Per Gross Ton:	Apr. 9, 1929	Apr. 2, 1929	Mar. 12, 1929	Apr. 10, 1928
No. 2 foundry, Philadelphia	$21.76	$21.76	$21.26	$20.76
No. 2, Valley furnace	18.00	18.00	17.50	17.25
No. 2 Southern, Cin'ti	19.19	19.19	20.19	19.69
No. 2, Birmingham	15.50	15.50	16.50	16.00
No. 2 foundry, Chicago*	20.00	20.00	20.00	18.50
Basic, del'd eastern Pa	20.25	20.25	20.25	19.50
Basic, Valley furnace	**18.00**	17.50	17.50	17.00
Valley Bessemer, del'd P'gh	20.26	20.26	20.01	19.26
Malleable, Chicago*	20.00	20.00	20.00	18.50
Malleable, Valley	18.50	18.50	18.00	17.25
Gray forge, Pittsburgh	19.26	19.26	18.76	18.51
L. S. charcoal, Chicago	27.04	27.04	27.04	27.04
Ferromanganese, furnace	105.00	105.00	105.00	100.00
Rails, Billets, Etc., Per Gross Ton:				
Rails, heavy, at mill	$43.00	$43.00	$43.00	$43.00
Light rails at mill	36.00	36.00	36.00	36.00
Rerolling billets, Pittsburgh	34.00	34.00	34.00	33.00
Sheet bars, Pittsburgh	35.00	35.00	35.00	34.00
Slabs, Pittsburgh	34.00	34.00	34.00	33.00
Forging billets, Pittsburgh	39.00	39.00	39.00	38.00
Wire rods, Pittsburgh	42.00	42.00	42.00	44.00
	Cents	Cents	Cents	Cents
Skelp, grvd. steel, P'gh, lb.	1.85	1.85	1.85	1.85
Finished Steel, *Per Lb. to Large Buyers:*	Cents	Cents	Cents	Cents
Bars, Pittsburgh	1.95	1.95	1.90	1.85
Bars, Chicago	2.05	2.05	2.05	2.00
Bars, Cleveland	1.95	1.95	1.95	2.04
Bars, New York	2.29	2.29	2.24	2.19
Tank plates, Pittsburgh	1.95	1.95	1.90	1.85
Tank plates, Chicago	2.05	2.05	2.05	2.00
Tank plates, New York	2.22½	2.22½	2.17½	2.17½
Structural shapes, Pittsburgh	1.95	1.95	1.90	1.85
Structural shapes, Chicago	2.05	2.05	2.05	2.00
Structural shapes, New York	2.19½	2.19½	2.14½	2.14½
Cold-finished bars, Pittsburgh	2.30	2.30	2.20	2.20
Hot-rolled strips, Pittsburgh	1.90	1.90	1.80	2.10
Cold-rolled strips, Pittsburgh	2.75	2.75	2.85	3.00

*The average switching charge for delivery to foundries in the Chicago district is 61c. per ton.

Finished Steel, *Per Lb. to Large Buyers:*	Apr. 9, 1929 Cents	Apr. 2, 1929 Cents	Mar. 12, 1929 Cents	Apr. 10, 1928 Cents
Sheets, black, No. 24, P'gh	2.85	2.85	2.85	2.80
Sheets, black, No. 24, Chicago dist. mill	3.05	3.05	3.05	3.00
Sheets, galv., No. 24, P'gh	3.60	3.60	3.60	3.65
Sheets, galv., No. 24, Chicago dist. mill	3.80	3.80	3.80	3.85
Sheets, blue, 9 and 10, P'gh	2.10	2.10	2.10	2.10
Sheets, blue, 9 and 10, Chicago dist. mill	2.30	2.30	2.30	2.20
Wire nails, Pittsburgh	2.65	2.65	2.65	2.65
Wire nails, Chicago dist. mill	2.70	2.70	2.70	2.70
Plain wire, Pittsburgh	2.50	2.50	2.50	2.50
Plain wire, Chicago dist. mill	2.55	2.55	2.55	2.55
Barbed wire, galv., Pittsburgh	3.30	3.30	3.30	3.35
Barbed wire, galv., Chicago dist. mill	3.35	3.35	3.35	3.40
Tin plate, 100 lb. box, P'gh	$5.35	$5.35	$5.35	$5.25
Old Material, Per Gross Ton:				
Heavy melting steel, P'gh	$18.75	$18.75	$18.25	$15.50
Heavy melting steel, Phila	17.00	17.00	16.00	13.50
Heavy melting steel, Ch'go	**16.00**	**16.00**	**15.50**	**12.50**
Carwheels, Chicago	14.50	14.50	14.50	13.50
Carwheels, Philadelphia	16.50	16.50	16.50	15.50
No. 1 cast, Pittsburgh	15.50	15.50	15.00	14.50
No. 1 cast, Philadelphia	16.50	16.50	16.50	16.00
No. 1 cast, Ch'go (net ton)	16.00	16.00	16.00	14.00
No. 1 RR. wrot., Phila	16.00	16.00	16.00	15.00
No. 1 RR. wrot., Ch'go (net)	14.00	14.00	14.00	11.00
Coke, Connellsville, Per Net Ton at Oven:				
Furnace coke, prompt	*$2.80*	$2.85	$3.00	$2.60
Foundry coke, prompt	3.75	3.75	3.75	3.75
Metals, *Per Lb. to Large Buyers:*	Cents	Cents	Cents	Cents
Lake copper, New York	*22.00*	24.12½	20.12½	14.30
Electrolytic copper, refinery	*21.75*	23.75	19.75	14.12½
Tin (Straits), New York	*46.62½*	48.50	48.37½	52.00
Zinc, East St. Louis	6.80	6.80	6.35	5.75
Zinc, New York	7.15	7.15	6.70	6.10
Lead, St. Louis	*7.10*	7.65	7.15	6.00
Lead, New York	*7.25*	7.75	7.25	6.10
Antimony (Asiatic), N. Y.	*9.50*	9.62½	9.37½	9.62½

On export business there are frequent variations from the above prices. Also, in domestic business, there is at times a range of prices on various products, as shown in our market reports on other pages.

Pittsburgh

Steel Business Still Heavy, Though Shipments May Now Exceed Orders—Basic Pig Iron Up 50c.

PITTSBURGH, April 9.—Incoming steel business still is in heavy volume, although it suffers somewhat by comparison with the March record, and in some products the report is heard that new orders and specifications are not quite up to shipments on older commitments. Some slowing up of new buying was to be expected following the really phenomenal showing in the first quarter of the year and the mounting momentum of the final month of the period. There is, accordingly, little concern over the fact that the extreme peak of activity appears to have been reached, and there is a fairly common belief that such recession as may occur in the next few months will not assume the proportions of a slump. An early spring is counted on to give the farmers of the country a good start, and this will mean much to the prosperity of business in general and to the steel business in particular.

Steel makers are starting the second quarter with good order books in most products, and, in strips and sheets, delivery promises on new orders are extended. There are cases where early June is as soon as some makers of hot-rolled strips are promising shipments. Getting a place on sheet mill order books for reasonably early delivery also is difficult. It is not that consumption has caught up with and passed productive capacity, but rather that buyers have become convinced of the need of more extended coverage than they have considered necessary in the recent past. If there has been overbuying, it will be corrected through delaying of shipments and any such postponements would permit the putting in of new tonnages in rolling schedules to the extent of the postponed shipments.

No evidence is seen of stocking of steel by consumers, unless automobiles and manufactures of steel in the hands of distributers can be so considered. Analysis of production of automobiles suggests that dealers now are heavily stocked.

Advances on strips and cold-finished steel bars appear to be well established, and higher prices named for second quarter on plates, shapes and bars are generally quoted, but on account of some carryover of first quarter business still are subject to a real test. There is a firmer tendency in sheet prices, few makers being desirous of adding to already full order books except at the advances announced for second quarter. Sheet consumers appear to be getting all they need on existing orders, and fresh purchases are neither frequent nor in important volume.

Basic pig iron has moved up 50c. a ton to $18, Valley furnace, on a sale of 1000 tons; producers have been asking that price for the past few weeks, but have found it difficult to establish it on other than small lots. High grade steel works scrap is scarce and hovers close to $19, delivered this district. Furnace coke is weaker, now being quotable at $2.80 to $2.90 a ton.

Pig Iron.—The interesting event of the week is a sale of 1000 tons of basic iron at $18, Valley furnace. Producers for the past three weeks have been quoting that price, but this is the first clear-cut transaction of a quotation-making tonnage that has been made at it. The market thus becomes quotable on this grade at $18, Valley furnace, an advance of 50c. a ton. No change has occurred in the prices of other grades. Business is notable for active deliveries on old orders, particularly to the steel foundries and steel makers which do not make their own iron, and for a steady demand for small to moderate-sized lots of spot iron, in which Bessemer, malleable and foundry grades are sharing. The Neville furnace of the Davison Coke & Iron Co. will be blown in late in May, the work of rebuilding the furnace plant having made rapid progress on account of favorable weather.

Prices per gross ton, f.o.b. Valley furnace:

Basic	$18.00
Bessemer	18.50
Gray forge	17.50
No. 2 foundry	18.00
No. 3 foundry	17.50
Malleable	18.50
Low phos., copper free	$26.50 to 27.00

Freight rate to Pittsburgh or Cleveland district, $1.76.

Semi-Finished Steel.—Supplies of billets, slabs and sheet bars are no more than sufficient to take care of the requirements of producers and their regular contract customers. Some of the latter might use more steel than they are getting, but it is among the fully integrated companies that real shortages exist and make necessary the shutting down of some finishing mills so that others producing materials most urgently wanted may be kept in full operation. Prices are very firm. Prices of wire rods also are firmly held, and the movement on contracts is large, especially to bolt and rivet makers and to producers of cold-finished steel bars.

Bars, Plates and Shapes.—All three products are quoted at 1.95c., base Pittsburgh, and a fair amount of second quarter tonnage has been written at that price. Most of the current deliveries, however, are on first quarter contracts, on which 1.90c., base, was the ruling maximum price, and the test of the higher figure will come when consumers have exhausted their present commitments. From the standpoint of order books, the situation looks stronger in bars than in plates or large structural shapes, although in the past week local fabricating shops have booked 5600 tons of railroad bridges. Awards have been made in Washington of 40 large steel barges for the Inland Waterways Corporation, taking 22,000 tons of plates and shapes. Local railroad car builders are better fixed with orders than in a long time, but the steel for recent car and structural steel awards was spoken for or under option well in advance of the placing of the orders or the advance in prices.

Warehouse Prices, f.o.b. Pittsburgh

	Base per Lb.
Plates	3.00c.
Structural shapes	3.00c.
Soft steel bars and small shapes	2.90c.
Reinforcing steel bars	2.75c.
Cold-finished and screw stock—	
Rounds and hexagons	3.60c.
Squares and flats	4.10c.
Bands	3.25c.
Hoops	4.25c.
Black sheets (No. 24), 25 or more bundles	3.80c.
Galv. sheets (No. 24), 25 or more bundles	4.55c.
Blue ann'l'd sheets (No. 10), 1 to 10 sheets	3.45c.
Galv. corrug. sheets (No. 28), per square	$4.43
Spikes, large	3.40c.
Small	3.80c. to 5.25c.
Boat	3.80c.
Track bolts, all sizes, per 100 count,	60 per cent off list
Machine bolts, 100 count,	60 per cent off list
Carriage bolts, 100 count,	60 per cent off list
Nuts, all styles, 100 count,	60 per cent off list
Large rivets, base per 100 lb.	$3.50
Wire, black soft ann'l'd, base per 100 lb	$3.00 to 3.10
Wire, galv. soft, base per 100 lb.	3.00 to 3.10
Common wire nails, per keg	3.00
Cement coated nails, per keg	3.05

Rails and Track Supplies.—There is a good movement of standard-section rails and of track accessories on old orders, but only a moderate amount of new business. Light-section rails still are dull.

Wire Products.—Nails still are slow to improvement in demand, but other wire products are moving steadily. Because this is the time for large consumption, shipments are running heavier than in either March or February. Prices are holding well in most centers of distribution.

Tubular Goods.—Attention of steel pipe producers now is centered on the proposed gas line to run from Monroe, La., to Birmingham, calling for 1000 miles of 20-in. or 22-in. pipe. This line is yet to be financed, however, and that probably means that some time will elapse before the pipe order is placed. Spang, Chalfant & Co. will supply 25 miles of the 22-in. pipe for the Mississippi Valley Fuel Corporation line from Monroe, La., to St. Louis. Buttwelded pipe is selling steadily for building and construction work, but lapwelded goods, particularly for oil country shipments, are slow and there has been some letdown in the demand for seamless casing. Tubing is doing well, particularly mechanical tubing for motor cars.

Sheets.—Makers view with great satisfaction a distinctly stronger situation. Order books sufficient to assure capacity mill engagement for the next three months, if there is full specification, have a tendency to make manufacturers less anxious for additional obligations except at the full second quarter prices, or 2.95c., base Pittsburgh, for black, 3.70c., base, for galvanized, and 2.20c., base, for blue annealed. Much business has been entered at those prices, but it will be another month before consumers have reduced their protection at lower prices to a point where they must specify on the higher-priced orders. There is no letdown in mill operations; while there is somewhat less urgency in the delivery demands of the motor car builders, the slack has been pretty well taken up by increased releases for other consuming industries, notably from railroad car builders.

Tin Plate.—Weather conditions have favored heavy planting of the canning crops and container manufacturers continue to take out tin plate freely in preparation for a huge pack this year. Mill operations are rising and now are estimated at fully 95 per cent of capacity, with the leading producer running more than 90 per cent and the independents sufficiently above

The Iron Age Composite Prices

Finished Steel

April 9, 1929, 2.412c. a Lb.

One week ago	2.412c.
One month ago	2.391c.
One year ago	2.362c.
10-year pre-war average	1.689c.

Based on steel bars, beams, tank plates, wire, nails, black pipe and black sheets. These products make 87 per cent of the United States output of finished steel.

	High		Low	
1929	2.412c.,	Apr. 2;	2.391c.,	Jan. 8
1928	2.391c.,	Dec. 11;	2.314c.,	Jan. 3
1927	2.453c.,	Jan. 4;	2.293c.,	Oct. 25
1926	2.453c.,	Jan. 5;	2.403c.,	May 18
1925	2.560c.,	Jan. 6;	2.396c.,	Aug. 18

Pig Iron

April 9, 1929, $18.54 a Gross Ton

One week ago	$18.46
One month ago	18.38
One year ago	17.67
10-year pre-war average	15.72

Based on average of basic iron at Valley furnace and foundry irons at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

	High		Low	
1929	$18.54,	Apr. 9;	$18.29,	Mar. 19
1928	18.59,	Nov. 27;	17.04,	July 24
1927	19.71,	Jan. 4;	17.54,	Nov. 1
1926	21.54,	Jan. 5;	19.46,	July 13
1925	22.50,	Jan. 13;	18.96,	July 7

Mill Prices of Finished Iron and Steel Products

Iron and Steel Bars

Soft Steel

	Base per Lb.
F.o.b. Pittsburgh mill	1.95c.
F.o.b. Chicago	2.05c. to 2.15c.
Del'd Philadelphia	2.27c.
Del'd New York	2.29c.
Del'd Cleveland	1.95c. to 2.00c.
F.o.b. Cleveland	1.95c. to 2.00c.
F.o.b. Lackawanna	2.05c.
F.o.b. Birmingham	2.15c.
C.i.f. Pacific ports	2.35c.
F.o.b. San Francisco mills	2.35c. to 2.40c.

Billet Steel Reinforcing

F.o.b. Pittsburgh mills, 40, 50, 60-ft.	2.00c.
F.o.b. Pittsburgh mills, cut lengths	2.25c.
F.o.b. Birmingham, mill lengths	2.15c.

Rail Steel

F.o.b. mills, east of Chicago dist.	1.85c.
F.o.b. Chicago Heights mill	1.95c.

Iron

Common iron, f.o.b. Chicago	2.05c. to 2.10c.
Refined iron, f.o.b. P'gh mills	2.75c.
Common iron, del'd Philadelphia	2.12c.
Common iron, del'd New York	2.14c.

Tank Plates

	Base per Lb.
F.o.b. Pittsburgh mill	1.95c.
F.o.b. Chicago	2.05c.
F.o.b. Birmingham	2.15c.
Del'd Cleveland	2.14c.
Del'd Philadelphia	2.15c.
F.o.b. Coatesville	2.05c.
F.o.b. Sparrow Point	2.05c.
F.o.b. Lackawanna	2.05c.
Del'd New York	2.22½c.
C.i.f. Pacific ports	2.20c. to 2.30c.

Structural Shapes

	Base per Lb.
F.o.b. Pittsburgh mill	1.95c.
F.o.b. Chicago	2.05c. to 2.15c.
F.o.b. Birmingham	2.15c.
F.o.b. Lackawanna	2.05c.
F.o.b. Bethlehem	2.05c.
Del'd Cleveland	2.14c.
Del'd Philadelphia	2.01c. to 2.06c.
Del'd New York	2.14½c.
C.i.f. Pacific ports	2.35c.

Hot-Rolled Hoops, Bands and Strips

	Base per Lb.
6 in. and narrower, P'gh	2.00c.
Wider than 6 in., P'gh	1.90c.
6 in. and narrower, Chicago	2.20c.
Wider than 6 in., Chicago	2.10c.
Cooperage stock, P'gh	2.20c.
Cooperage stock, Chicago	2.30c.

Cold-Finished Steel

	Base per Lb.
Bars, f.o.b. Pittsburgh mill	2.30c.
Bars, f.o.b. Chicago	2.30c.
Bars, Cleveland	2.35c.
Shafting, ground, f.o.b. mill	*2.65c. to 3.60c.
Strips, P'gh	2.75c. to 2.85c.
Strips, Cleveland	2.75c. to 2.85c.
Strips, del'd Chicago	3.05c. to 3.15c.
Strips, Worcester	2.90c. to 3.00c.
Fender stock, No. 20 gage, Pittsburgh or Cleveland	4.25c. to 4.35c.

*According to size.

Wire Products

(Carload lots, f.o.b. Pittsburgh and Cleveland, to jobbers and retailers.)

	Base per Keg
Wire nails	$2.65 to $2.75
Galvanized nails	4.65 to 4.75
Galvanized staples	3.35 to 3.45
Polished staples	3.10 to 3.20
Cement coated nails	2.65 to 2.75
	Base per 100 Lb.
Bright plain wire, No. 6 to No. 9 gage	$2.50 to $2.60
Annealed fence wire	2.65 to 2.75
Spring wire	3.50 to 3.60
Galv'd wire, No. 9	3.10 to 3.20
Barbed wire, galv'd	3.30 to 3.40
Barbed wire, painted	3.05 to 3.15
Woven wire fence (per net ton to retailers)	65.00

Chicago district mill and delivered Chicago prices are $1 per ton above the foregoing. Birmingham mill prices $3 a ton higher; Worcester, Mass., (wire) mill $3 a ton higher on production of that plant; Duluth, Minn., mill $2 a ton higher; Anderson, Ind., $1 higher.

Cut Nails

	Per 100 Lb.
Carloads, Wheeling, Reading or Northumberland, Pa.	$2.70
Less carloads, Wheeling or Reading	2.80

Sheets

Blue Annealed

	Base per Lb.
Nos. 9 and 10, f.o.b. P'gh	2.10c. to 2.20c.
Nos. 9 and 10, f.o.b. Chicago dist.	2.30c.
Nos. 9 and 10, del'd Cleveland	2.29c. to 2.39c.
Nos. 9 and 10, del'd Philadelphia	2.42c. to 2.52c.
Nos. 9 and 10, f.o.b. Birmingham	2.25c. to 2.35c.

Box Annealed, One Pass Cold Rolled

No. 24, f.o.b. Pittsburgh	2.85c. to 2.95c.
No. 24, f.o.b. Chicago dist. mill	3.05c.
No. 24, del'd Cleveland	3.04c. to 3.14c.
No. 24, del'd Philadelphia	3.17c. to 3.27c.
No. 24, f.o.b. Birmingham	3.00c. to 3.10c.

Metal Furniture Sheets

No. 24, f.o.b. P'gh, No. 1 grade	4.00c. to 4.10c.
No. 24, f.o.b. P'gh, No. 2 grade	3.80c. to 3.90c.

Galvanized

No. 24, f.o.b. Pittsburgh	3.60c. to 3.70c.
No. 24, f.o.b. Chicago dist. mill	3.80c.
No. 24, del'd Cleveland	3.79c. to 3.89c.
No. 24, del'd Philadelphia	3.92c. to 4.02c.
No. 24, f.o.b. Birmingham	3.75c. to 3.85c.

Tin Mill Black Plate

No. 28, f.o.b. Pittsburgh	3.00c.
No. 28, f.o.b. Chicago dist. mill	3.10c.

Automobile Body Sheets

No. 20, f.o.b. Pittsburgh	4.10c.

Long Ternes

No. 24, 8-lb. coating, f.o.b. mill	4.00c.

Vitreous Enameling Stock

No. 24, f.o.b. Pittsburgh	3.90c.

Tin Plate

	Per Base Box
Standard cokes, f.o.b. P'gh district mills	$5.35
Standard cokes, f.o.b. Gary	5.45

Terne Plate

(*F.o.b. Morgantown or Pittsburgh*)
(Per Package, 20 x 28 in.)

8-lb. coating I.C.	$11.20
15-lb. coating I.C.	14.00
20-lb. coating I.C.	15.30
25-lb. coating I.C.	$16.70
30-lb. coating I.C.	17.75
40-lb. coating I.C.	19.85

Alloy Steel Bars

(F.o.b. maker's mill)

Alloy Quality Bar Base, 2.65c. to 2.75c. per Lb.

S.A.E. Series Numbers		Alloy Differential
2000	(1¼% Nickel)	0.25
2100	(1¾% Nickel)	0.55
2300	(3½% Nickel)	1.50
2500	(5% Nickel)	2.25
3100	Nickel Chromium	0.55
3200	Nickel Chromium	1.35
3300	Nickel Chromium	3.80
3400	Nickel Chromium	3.20
4100	Chromium Molybdenum (0.15 to 0.25 Molybdenum)	0.50
4100	Chromium Molybdenum (0.25 to 0.40 Molybdenum)	0.70
4600	Nickel Molybdenum (0.20 to 0.30 Molybdenum, 125 to 1.75 Nickel)	1.05
5100	Chromium Steel (0.60 to 0.90 Chromium)	0.35
5100	Chromium Steel (0.80 to 1.10 Chromium)	0.45
5100	Chromium Spring Steel	0.20
6100	Chromium Vanadium Bars	1.20
6100	Chromium Vanadium Spring Steel	0.95
9250	Silicon Manganese Spring Steel (flats)	0.25
	Rounds and squares	0.50
	Chromium Nickel Vanadium	1.50
	Carbon Vanadium	0.95

Above prices are for hot rolled steel bars, forging quality. The ordinary differential for cold-drawn bars is ¾c. per lb. higher. For billets 4 x 4 to 10 x 10 in., the price for a gross ton is the net price for bars of the same analysis. For billets under 4 x 4 down to and including 2½ in. squares, the price is $5 a gross ton above the 4 x 4 billet price.

Slabs with sectional area of 16 in. or over carry the billet price; slabs with sectional area of 12 in. to 16 in. carry a $5 extra above the billet price and slabs with a sectional area under 12 in. carry the bar price.

Band sizes are 40c. per 100 lb. higher.

Rails

	Per Gross Ton
Standard, f.o.b. mill	$43.00
Light (from billets), f.o.b. mill	36.00
Light (from rail steel), f.o.b. mill	34.00
Light (from billets), f.o.b. Ch'go mill	36.00

Track Equipment

	Base per 100 Lb.
Spikes, ⅝ in. and larger	$2.80
Spikes, ½ in. and smaller	2.80
Spikes, boat and barge	3.00
Tie plates, steel	2.15
Angle bars	$2.75
Track bolts, to steam railroads	$3.50 to 4.00
Track bolts, to jobbers, all sizes, per 100 count	70 per cent off list

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills

Butt Weld

Steel Inches	Steel Black	Steel Galv.	Iron Inches	Iron Black	Iron Galv.
⅛	45	19½	¼ and ⅜	+11	+36
¼ to ⅜	51	25½	½	23	5
½	56	42½	¾	28	11
¾	60	48½	1 and 1¼	31	18
1 to 3	62	50½	1½ and 2	35	18

Lap Weld

2	55	43½	2	23	9
2½ to 6	59	47½	2½ to 3½	28	13
7 and 8	56	43½	4 to 6	30	17
9 and 10	54	42½	7 and 8	29	16
11 and 12	53	40½	9 to 12	26	11

Butt Weld, extra strong, plain ends

⅛	41	24½	¼ and ⅜	+13	+48
¼ to ⅜	47	30½	½	23	7
½	53	42½	¾	28	13
¾	58	47½	1 to 2	34	18
1 to 1½	60	49½			
2 to 3	61	50½			

Lap Weld, extra strong, plain ends

2	53	42½	2	29	13
2½ to 4	57	46½	2½ to 4	34	20
4½ to 6	56	45½	4½ to 6	33	19
7 to 8	52	39½	7 and 8	31	17
9 and 10	45	32½	9 to 12	21	8
11 and 12	44	31½			

On carloads the above discounts on steel pipe are increased on black by one point, with supplementary discount of 5%, and on galvanized by 1½ points, with supplementary discount of 5%. On iron pipe, both black and galvanized, the above discounts are increased to jobbers by one point with supplementary discounts of 5 and 2½%.

Note.—Chicago district mills have a base two points less than the above discounts. Chicago delivered base is 2½ points less. Freight is figured from Pittsburgh, Lorain, Ohio, and Chicago district mills, the billing being from the point producing the lowest price to destination.

Boiler Tubes

Base Discounts, f.o.b. Pittsburgh

Steel		Charcoal Iron	
2 in. and 2¼ in.	40	1½ in.	1
2½ in.—2¾ in.	48	1¾ in.	8
3 in.	54	2 in.—2¼ in.	13
3¼ in.—3¾ in.	56	2½ in.—2¾ in.	16
4 in.	59	3 in.	17
4½ in. to 6 in.	48	3¼ in. to 3½ in.	18
		4 in.	20
		4½ in.	21

On lots of a carload or more, the above base discounts are subject to a preferential of two fives on steel and of 10 per cent on charcoal iron tubes. Smaller quantities are subject to the following modifications from the base discounts:

Lap Welded Steel—Under 10,000 lb., 6 points under base and one five; 10,000 lb. to carload, 4 points under base and two fives. Charcoal Iron—Under 10,000 lb., 2 points under base; 10,000 lb. to carload, base and one five.

Standard Commercial Seamless Boiler Tubes

Cold Drawn

1 in.	63	3 in.	42
1¼ to 1½ in.	55	3¼ to 3½ in.	50
1¾ in.	39	4 in.	53
2 to 2¼ in.	34	4½, 5 and 6 in.	43
2½ to 2¾ in.	42		

Hot Rolled

2 and 2¼ in.	40	3¼ to 3½ in.	50
2½ and 2¾ in.	48	4 in.	59
3 in.	54	4½, 5 and 6 in.	48

Beyond the above base discounts a preferential discount of 5 per cent is allowed on carload lots. On less than carloads to 10,000 lb. base discounts are reduced 4 points with 5 per cent preferential; on less than 10,000 lb., base discounts are reduced 6 points, with no preferential. No extra for lengths up to and including 24 ft. Sizes smaller than 1 in. and lighter than standard gage take mechanical tube list and discounts. Intermediate sizes and gages not listed take price of next larger outside diameter and heavier gage.

Seamless Mechanical Tubing

	Per Cent Off List
Carbon, 0.10% to 0.30%, base (carloads)	55
Carbon, 0.30% to 0.40%, base	50

Plus differentials for lengths over 18 ft. and for commercial exact lengths. Warehouse discounts on small lots are less than the above.

that mark to bring up the general average.

Cold-Finished Steel Bars and Shafting.—Production and shipments still are heavy, but completed orders appear to be running somewhat in excess of incoming business. Buyers are depending largely on shipments on first quarter contracts, but a few specifications are coming in on second quarter contracts; the latter carry 2.30c., base Pittsburgh, or $2 a ton above the first quarter price.

Bolts, Nuts and Rivets.—Makers now are quoting large rivets at $3.10 per 100 lb., base Pittsburgh, and $3.20, base Chicago; lower prices disappeared with the end of the first quarter. Bolt and nut makers have sufficient business to maintain a production of between 70 and 75 per cent of capacity, which is a high rate in view of the fact that not long ago 50 to 55 per cent engagement of capacity was considered sufficient to supply the country's needs.

Hot-Rolled Strip. — New business placed during the first week of the month was slightly below the March levels, but this was to be expected in view of the heavy specifications and orders which came in during the previous week. Operations are being maintained at practical capacity, and, with this rate assured until May 15 at least, prices are firm. Orders are being placed at 2c. for stock 6 in. and narrower and at 1.90c. for the wider sizes. Consumers are beginning to specify freely on second quarter contracts at these levels. A similar condition exists on bands and cooperage stock.

Cold-Rolled Strip. — Recent orders include a fair amount of second quarter contract business, and, although producers will not complete shipments on first quarter specifications before the end of the month, it is likely the present high operating rate can easily be maintained well into June. Prices are well established at 2.75c., base, with a premium of $2 a ton usually asked on small lots. The new card of extras now is generally effective.

Coke and Coal.—Further dwindling in demand for spot furnace coke has resulted in a price decrease of 5c. a ton, and the market is now quotable at $2.80 to $2.90 a ton, Connellsville. Curtailment in production continues, but is not keeping pace with the lessening in demand. Foundry coke is going into consumption at a good rate, and there is a sustained demand for spot shipment at the established prices. Coal prices are weaker.

Old Material.—A Pittsburgh district steel maker recently bought a good-sized tonnage of No. 2 heavy melting steel and a round lot of compressed sheets, paying $17 for the former and $19 for the latter. Other sales of compressed sheets are noted at $18.50. There continues to be active dealer buying of No. 1 heavy melting steel at $18.50 for some points and at $19 for at least one point in the district. Dealers who owe the latter grade on old orders are finding it hard to cover, as the offerings are very scant, and producers are not pressing supplies upon the market so long as there are no signs of a letdown in open-hearth furnace operations. Heavy melting steel in the Baltimore & Ohio Railroad April scrap list is reported to have been sold at $19.15, delivered to a Pittsburgh district mill.

Prices per gross ton delivered consumers' yards in Pittsburgh and points taking the Pittsburgh district freight rate:

Basic Open-Hearth Grades:	
No. 1 heavy melting steel	$18.50 to $19.00
No. 2 heavy melting steel	17.00
Scrap rails	18.50 to 19.00
Compressed sheet steel	18.50 to 19.00
Bundled sheets, sides and ends	17.00 to 17.50
Cast iron carwheels	16.50 to 17.00
Sheet bar crops, ordinary	19.00
Heavy breakable cast	13.50 to 14.00
No. 2 railroad wrought	18.50 to 19.00
Hvy. steel axle turnings	16.50 to 17.50
Machine shop turnings	11.00 to 11.50
Acid Open-Hearth Grades:	
Railr. knuckles and couplers	22.00 to 22.50
Railr. coil and leaf springs	22.00 to 22.50
Rolled steel wheels	22.00 to 22.50
Low phos. billet and bloom ends	23.50 to 24.00
Low phos., mill plates	22.00 to 22.50
Low phos., light grades	21.50 to 22.00
Low phos., sheet bar crops	22.50 to 23.00
Heavy steel axle turnings	16.50 to 17.50
Electric Furnace Grades:	
Low phos., punchings	21.50 to 22.00
Hvy. steel axle turnings	16.50 to 17.50
Blast Furnace Grades:	
Short shoveling steel turnings	12.00 to 13.00
Short mixed borings and turnings	12.00 to 13.00
Cast iron borings	12.00 to 13.00
Rolling Mill Grades:	
Steel car axles	21.00 to 22.00
No. 1 railroad wrought	14.50 to 15.50
Sheet bar crops	20.50 to 21.00
Cupola Grades:	
No. 1 cast	15.50 to 16.00
Rails 3 ft. and under	21.00 to 22.00

Decline in Construction in March

Volume of construction in 27 States in March is reported by the Associated General Contractors of America at 5 per cent less than in February, in place of the customary increase in March. The February total was 15 per cent below that of January and 26 per cent lower than in February of last year. The decline is stated in the report by the association as being traceable to the diversion of money into speculative channels.

Automobile Makers Expect Decline in Last Half

Following the series of new records in automobile production which culminated in the announcement that the total output of passenger cars and trucks in the United States and Canada in the first quarter was approximately 1,514,000 units, the question is being widely promulgated whether dealers' new car stocks should be considered excessive. An investigation conducted by *Automotive Industries* reveals that only a few manufacturers have found anything to indicate such a condition.

However, the feeling exists that the last half of 1929 will show little, if any, increase in production over the corresponding period of 1928, when the factories of the United States and Canada turned out 2,274,621 cars and trucks. It is generally believed that the seasonal decline in automobile production may be slightly more pronounced this year than usual, in view of the great output already recorded.

Safety Talks to Be Broadcast by Radio

With an address on "Safety as a Factor in Industry," Charles M. Schwab, chairman of the board, Bethlehem Steel Corporation, will inaugurate at 7.30 p. m. April 20 a series of 13 weekly programs to be presented by the National Broadcasting Co. in conjunction with the National Safety Council. These programs, designated as the "Universal Safety Series" will be broadcast over a nationwide network.

American Agent Appointed for Swedish Carbon Tester

The Kelly-Decker Co., 39 Cortlandt Street, New York, dealer in coke, limestone, and pig iron, has been appointed exclusive sales agent in the United States and Canada for the Carbometer, manufactured by the Aktiebolaget Alpha, Sundbyberg, Sweden. The device is an instrument for determination of the exact carbon content in the bath for open-hearth and electric furnaces, either acid or basic. Its purpose is to provide the melter with an exact carbon determination in 1½ min. on high carbon and 2½ min. on low carbon heats, instead of the longer period usually required for a preliminary test in the laboratory. The meter has been used for a number of years by many of the large steel plants in Europe and by some mills in the United States. C. B. Collingwood, an experienced open-hearth furnace operator, will represent the Kelly-Decker Co. in sales of the Carbometer.

Government Offers 23 Ships for Scrap or Barges

WASHINGTON, April 9.—The Merchant Fleet Corporation of the Shipping Board will take bids up to May 7 on 23 steel cargo vessels, aggregating 198,962 deadweight tons, which the board has ordered sold with the understanding that they are either to be scrapped or converted to barges or Diesel propulsion. Eleven vessels are laid up at Norfolk, Va., nine at New York and three at Philadelphia.

American locomotives to the value of £82,656 are included in the contract, involving £270,000, made by the South African Railway Administration for 38 engines, according to a report received from Assistant Trade Commissioner Edward B. Lawson, Johannesburg.

Semi-Finished Steel, Raw Materials, Bolts and Rivets

Mill Prices of Semi-Finished Steel

Billets and Blooms

	Per Gross Ton
Rerolling, 4 in. and under 10 in., Pittsburgh	$34.00
Rerolling, 4 in. and under 10 in., Youngstown	34.00
Rerolling, 4 in. and under 10 in., Cleveland	35.00
Rerolling, 4 in. and under 10 in., Chicago	35.00
Forging quality, Pittsburgh	39.00

Sheet Bars

(Open Hearth or Bessemer)

	Per Gross Ton
Pittsburgh	$35.00
Youngstown	35.00
Cleveland	35.00

Slabs

(8 in. x 2 in. and under 10 in. x 10 in.)

	Per Gross Ton
Pittsburgh	$34.00
Youngstown	34.00
Cleveland	34.00

Skelp

(F.o.b. Pittsburgh or Youngstown)

	Per Lb.
Grooved	1.85c. to 1.90c.
Universal	1.85c. to 1.90c.
Sheared	1.85c. to 1.90c.

Wire Rods

(Common soft, base)

	Per Gross Ton
Pittsburgh	$42.00
Cleveland	42.00
Chicago	43.00

Prices of Raw Material

Ores

Lake Superior Ores, Delivered Lower Lake Ports

	Per Gross Ton
Old range Bessemer, 51.50% iron	$4.80
Old range non-Bessemer, 51.50% iron	4.65
Mesabi Bessemer, 51.50% iron	4.65
Mesabi non-Bessemer, 51.50% iron	4.50
High phosphorus, 51.50% iron	4.40

Foreign Ore, c.i.f. Philadelphia or Baltimore

	Per Unit
Iron ore, low phos., copper free, 55 to 58% iron in dry Spanish or Algerian	10.00c.
Iron ore, low phos., Swedish, average 68% iron	10.00c.
Iron ore, basic Swedish, average 65% iron	9.00c.
Manganese ore, washed, 52% manganese, from the Caucasus	33.00c. to 35.00c.
Manganese ore, Brazilian, African or Indian, basic 50%	33.00c. to 35.00c.
Tungsten ore, high grade, per unit, in 60% concentrates	$14.00 to $15.00
	Per Gross Ton
Chrome ore, 45 to 50% Cr_2O_3, crude, c.i.f. Atlantic seaboard	$22.00 to $24.00
	Per Lb.
Molybdenum ore, 85% concentrates of MoS_2, delivered	50c. to 55c.

Coke

	Per Net Ton
Furnace, f.o.b. Connellsville prompt	$2.80 to $2.90
Foundry, f.o.b. Connellsville prompt	3.75 to 4.85
Foundry, by-product, Ch'go ovens	8.00
Foundry, by-product, New England, del'd	11.00
Foundry, by-product, Newark or Jersey City, delivered	9.00 to 9.40
Foundry, Birmingham	5.00
Foundry, by-product, St. Louis, f.o.b. ovens	8.00
Foundry by-prod., del'd St. Louis	9.00

Coal

	Per Net Ton
Mine run steam coal, f.o.b. W. Pa. mines	$1.25 to $1.75
Mine run coking coal, f.o.b. W. Pa. mines	1.50 to 1.75
Gas coal, ¾-in., f.o.b. Pa. mines	1.90 to 2.00
Mine run gas coal, f.o.b. Pa. mines	1.65 to 1.75
Steam slack, f.o.b. W. Pa. mines	80c. to 90c.
Gas slack, f.o.b. W. Pa. mines	1.00 to 1.10

Ferromanganese

	Per Gross Ton
Domestic, 80%, seaboard	$105.00
Foreign, 80%, Atlantic or Gulf port, duty paid	105.00

Spiegeleisen

	Per Gross Ton Furnace
Domestic, 19 to 21%	$31.00 to $34.00
Domestic, 16 to 19%	29.00 to 32.00

Electric Ferrosilicon

	Per Gross Ton Delivered
50%	$83.50
75%	130.00

	Per Gross Ton Furnace		Per Gross Ton Furnace
10%	$35.00	12%	$39.00
11%	37.00	14 to 16%	45.00

Bessemer Ferrosilicon

F.o.b. Jackson County, Ohio, Furnace

	Per Gross Ton		Per Gross Ton
10%	$31.00	12%	$35.00
11%	33.00		

Silvery Iron

F.o.b. Jackson County, Ohio, Furnace

	Per Gross Ton		Per Gross Ton
6%	$24.00	10%	$29.00
7%	25.00	11%	31.00
8%	26.00	12%	33.00
9%	27.00		

Other Ferroalloys

Ferrotungsten, per lb., contained metal del'd	98c. to $1.05
Ferrochromium, 4 to 6% carbon and up, 65 to 70% Cr., per lb. contained Cr. delivered, in carloads	11.00c.
Ferrovanadium, per lb. contained vanadium, f.o.b. furnace	$3.15 to $3.65
Ferrocarbontitanium, 15 to 18%, per net ton, f.o.b. furnace, in carloads	$160.00
Ferrophosphorus, electric or blast furnace material, in carloads, 18%, Rockdale, Tenn., base, per gross ton	$91.00
Ferrophosphorus, electric 24%, f.o.b. Anniston, Ala., per gross ton	$122.50

Fluxes and Refractories

Fluorspar

	Per Net Ton
Domestic, 85% and over calcium fluoride, not over 5% silica, gravel, f.o.b. Illinois and Kentucky mines	$18.00
No. 2 lump, Illinois and Kentucky mines	20.00
Foreign, 85% calcium fluoride, not over 5% silica, c.i.f. Atlantic port, duty paid	$18.00 to 19.00
Domestic, No. 1 ground bulk, 95 to 98% calcium fluoride, not over 2½% silica, f.o.b. Illinois and Kentucky mines	32.50

Fire Clay Brick

	Per 1000 f.o.b. Works: High-Heat Duty Brick	Intermediate Heat Duty Brick
Pennsylvania	$43.00 to $46.00	$35.00 to $38.00
Maryland	43.00 to 46.00	35.00 to 38.00
New Jersey	50.00 to 65.00	.....
Ohio	43.00 to 46.00	35.00 to 38.00
Kentucky	43.00 to 46.00	35.00 to 38.00
Missouri	43.00 to 46.00	35.00 to 38.00
Illinois	43.00 to 46.00	35.00 to 38.00
Ground fire clay, per ton	7.00	

Silica Brick

	Per 1000 f.o.b. Works
Pennsylvania	$43.00
Chicago	52.00
Birmingham	50.00
Silica clay, per ton	$8.50 to 10.00

Magnesite Brick

	Per Net Ton
Standard sizes, f.o.b. Baltimore and Chester, Pa.	$65.00
Grain magnesite, f.o.b. Baltimore and Chester, Pa.	40.00
Standard size	45.00

Chrome Brick

	Per Net Ton
Standard size	$45.00

Mill Prices of Bolts, Nuts, Rivets and Set Screws

Bolts and Nuts

Per 100 Pieces

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

	Per Cent Off List
†Machine bolts	70
†Carriage bolts	70
Lag bolts	70
Plow bolts, Nos. 1, 2, 3 and 7 heads	70
Hot-pressed nuts, blank or tapped, square	70
Hot-pressed nuts, blank or tapped, hexagons	70
C.p.c. and t. square or hex. nuts, blank or tapped	70
Washers*	7.00c. to 6.75c. per lb. off list

*F.o.b. Chicago, New York and Pittsburgh.

†Bolts with rolled thread up to and including ⅛ in. x 6 in. take 10 per cent lower list prices.

Bolts and Nuts

	Per Cent Off List
Semi-finished hexagons nuts	70
Semi-finished hexagons castellated nuts, S.A.E.	70
Stove bolts in packages, Pittsburgh	80, 10 and 5
Stove bolts in packages, Chicago	75, 20, 10 and 5
Stove bolts in packages, Cleveland	75, 20, 10 and 5
Stove bolts in bulk, Pittsburgh	80, 10, 5 and 2½
Stove bolts in bulk, Chicago	75, 20, 10, 5 and 2½
Stove bolts in bulk, Cleveland	75, 20, 10, 5 and 2½
Tire bolts	60, 5 and 5

Discounts of 70 per cent off on bolts and nuts applied on carload business. For less than carload orders discounts of 55, 60 per cent apply.

Large Rivets

(½-In. and Larger)

	Base per 100 Lb.
F.o.b. Pittsburgh or Cleveland	$3.10
F.o.b. Chicago	3.20

Small Rivets

(⅞-In. and Smaller)

	Per Cent Off List
F.o.b. Pittsburgh	70 and 10
F.o.b. Cleveland	70 and 10
F.o.b. Chicago	70 and 10

Cap and Set Screws

(Freight allowed up to but not exceeding 50c. per 100 lb. on lots of 200 lb. or more)

	Per Cent Off List
Milled cap screws	80, 10 and 5
Milled standard set screws, case hardened	80 and 5
Milled headless set screws, cut thread	75 and 10
Upset hex. head cap screws, U.S.S. thread	85
Upset hex. cap screws, S.A.E. thread	85
Upset set screws	80, 10 and 5
Milled studs	70

Chicago

Steel Backlogs Increase and April Production May Exceed That of March—Heavy Demand for Plates

CHICAGO, April 9.—Backlogs of Chicago producers continue to increase, notwithstanding that shipments are undiminished from the record-breaking rate of March. Consumers, forced to make schedules further ahead because of deferred deliveries, still give evidence of using caution in covering requirements, and there is no indication of a speculative atmosphere in this market. With the second quarter contracting period past, it is noteworthy that new sales of steel are at the average of the past three months. The most urgent demand for finished steel is in the plate market, where deliveries have lengthened two weeks. This situation is accounted for by the urgent need for pipe laying programs and the added requirements of car builders. Welded pipe manufacture will take during April daily shipments of 2800 tons of plates. Car shops have reached a stride consistent with orders on their books, and are well scheduled to late July or early August.

Specifications for finished steel are the second largest this year, having been exceeded only in the week of March 15 to 21. Orders already on mill books assure a new record for April, but there is doubt in some quarters that the pressure being placed on open-hearth departments can be maintained to the end of the month. Demand for semi-finished steel is more severe now than in March and premiums are being obtained on tonnages going to other than regular customers. The secondary rail buying movement is of fair proportions.

Pig Iron.—Prices for Northern foundry iron remain firm at $20 a ton, local furnaces. The melt in this district is unusually heavy, and April shipments are running a shade heavier than the rate in March. Malleable foundries are well engaged and are obtaining higher prices for their products. Scarcity of skilled labor is still a factor in determining the output of some foundries. A few unsolicited orders for third quarter iron have come into the market and several contracts have been placed for that period. Great Lakes navigation may open early this year. Buffalo harbor is said to be opening. The Soo is still icebound, though recent warm weather has done much to relieve the situation there. It now appears that about five cargoes of Lake Erie iron are already scheduled to be shipped to Chicago.

Prices per gross ton at Chicago:

N'th'n No. 2 fdy., sil. 1.75 to 2.25	$20.00
N'th'n No. 1 fdy., sil. 2.25 to 2.75	20.50
Malleable, not over 2.25 sil.	20.00
High phosphorus	20.00
Lake Super. charcoal, sil. 1.50	27.04
So'th'n No. 2 fdy. (all rail)	21.51
Low phos., sil. 1 to 2, copper free	29.50
Silvery, sil. 8 per cent	30.79
Bess. ferrosilicon, 14-15 per cent	46.29

Prices are delivered consumers' yards except on Northern foundry, high phosphorus and malleable, which are f.o.b. local furnace, not including an average switching charge of 61c. per gross ton.

Ferroalloys.—This market is characterized by a steady flow of specifications, and shipments are at an undiminished rate. New purchases are scarce and when made are for scattered carloads. Spiegeleisen in carload lots is steady at $34 a ton, Hazard, Pa.

Prices delivered Chicago: 80 per cent ferromanganese, $112.56; 50 per cent ferrosilicon, $83.50 to $88.50; spiegeleisen, 19 to 21 per cent, $40.76.

Sheets.—Prices remain firm locally and are strengthening in the Northwest, where weakness has been prevalent for several weeks. Second quarter contracts are well covered and order books are heavier than usual, partly because a number of heavy-tonnage users have placed larger contracts than has been customary. Current specifications exceed shipments by a small margin. Shortage of raw steel is restricting output to 85 per cent of hot mill capacity, and on most finishes the best deliveries obtainable range from four to six weeks. Demand is well scattered among a wide variety of users. Barrel manufacturers are finding need for larger tonnages, and light tank makers report an improvement in business. Farm implement makers are operating at capacity, and jobbers are distributing normal quantities of sheets for this time of the year.

Base prices per lb., deliv'd from mill in Chicago: No. 24 black sheets, 3.10c.; No. 24 galv., 3.85c.; No. 10 blue ann'l'd, 2.35c. Deliv'd prices at other Western points are equal to the freight from Gary, plus the mill prices, which are 5c. per 100 lb. lower than Chicago delivered prices.

Rails and Track Supplies.—Pressure for shipments of standard-section rails is causing some producers to fall behind on delivery schedules. One Western mill has taken 15,000 tons on two secondary purchases. Because of inability to meet shipment demands against old contracts and the tightness in the raw steel supply, one seller is taking little interest in tonnages now being offered in the market. Demand for shipments of track supplies is heavy, and output is at capacity. New orders total 3000 tons. The light rail market is without feature.

Prices f.o.b. mill, per gross ton: Standard section open-hearth and Bess. rails, $43; light rails, rolled from billets, $36. *Per lb.:* Standard railroad spikes, 2.80c.; track bolts with square nuts, 3.80c.; steel tie plates, 2.15c.; angle bars, 2.75c.

Wire Products. — Continued improvement is noted in the distribution of wire and wire products throughout most of the farm areas. Warm and comparatively dry weather has brought some relief to flooded districts and has bettered the condition of country roads. Jobbers report a good movement from stocks, a condition that is not yet reflected in new orders at mills. Demand for nails shows marked improvement east of Chicago, and sellers believe that shipments will soon be larger in the Middle West. Mill stocks are well balanced and probably a trifle smaller than usual for this time of the year. Shipments to the manufacturing trade are heavy.

Cold-Rolled Strip.—Specifications are being received at an undiminished rate, and output is close to capacity. A fair portion of current shipments are against first quarter contracts, which were hurriedly specified in full when the deadline was set on the use of the old card of extras.

Semi-Finished Material.—The pressure for semi-finished steel is even greater than it was in March. There appear to be no supplies in excess of the requirements of producers for their own finishing mills and a few scattered contract customers. Prices are firm.

Cast Iron Pipe.—The market is active in Michigan and Ohio, but in Indiana and Illinois business is dull. Many local elections will be held this month, and sellers have hopes that inquiries will multiply early in May. Several railroads have been in the market for lots ranging from a carload to 100 tons each. Contractors have little to do, and they are finding this April the dullest in many years. Akron, Ohio, is reported to have divided 2700 tons of 4, 12 and 36-in. and 1200 tons of 6, 8 and 10-in. pipe between the United States Cast Iron Pipe & Foundry Co. and the American Cast Iron Pipe Co. The United States company bid $44.92 a ton, delivered, on the 6, 8, 10 and 12-in. pipe and $41.92 a ton on the 36-in. James B. Clow & Sons were successful bidders at Columbus, Ohio, on 1300 tons of pipe at $42, delivered, or $35.03 a ton, Birmingham. The United States company has been awarded 240 tons by Springfield, Ill., and the McWane Cast Iron Pipe Co. has taken 1150 tons of pipe for Roseville, Mich. Park Ridge, Ill., has awarded 650 tons to a contractor. French sellers are low at Detroit on 1500 tons of 24-in. and 3500 tons of 36-in. at $39.30 a ton, delivered. The American company bid $41 on 1000 tons of 24-in. and the Clow company was low on 1500 tons of 24-in. at $40.65. The Lynchburg Foundry Co. was low on 2000 tons of 36-in. at $40.92 and the United States company bid $41.95 a ton on the part of the specifications that called for sand cast pipe. Among fresh inquiries are 800 tons for Flint, Mich., and 350 tons for Whitefish Bay, Wis.

Prices per net ton, deliv'd Chicago: Water pipe, 6-in. and over, $44.20 to $46.20; 4-in., $48.20 to $50.20; Class A and gas pipe, $3 extra.

Structural Material.—Both fresh inquiries and awards are very light for this time of the year. Consideration is being given to adding two stories to the Mercantile Mart, Chicago. This structure, as originally designed, required 45,000 tons of structural ma-

terial, and the proposed addition will take 5000 tons more.

Mill prices on plain material, per lb.: 2.05c. to 2.15c. base, Chicago.

Bars.—Specifications for mild steel bars are heavy and well diversified. Manufacturers of road machinery are well engaged, and forgers are operating at capacity. Demand for alloy steel bars from automobile plants is spotty, but the total volume of shipments is unchanged. Specifications for rail steel bars continue to grow and now exceed production by a good margin. Demand from the bed trade is normal, following many weeks of sluggishness. Fence posts made from old rails are in more active demand, and specifications for hard steel reinforcing bars are measurably larger. Prices for rail steel bars are firm at 1.95c. a lb., Chicago Heights.

Plates.—Of special interest in this market is the report that over 75,000 tons of plates will be shipped from Chicago mills in April for the manufacture of welded pipe. Pressure for pipe steel is bringing about further delays in deliveries, which now are not better than 10 to 12 weeks. Car shops have increased schedules and are taking more tonnage. Steel for 500 freight and 30 suburban cars recently purchased by the Erie will be supplied by Western mills. Oil storage tank business is slack. Awards for the week total 4000 tons, for delivery in the South, and fresh inquiries call for 1500 tons.

Mill prices on plates, per lb.: 2.05c. to 2.15c. base, Chicago.

Old Material.—This market remains strong, with prices firm. Dealers show little hesitancy in paying railroads $17 a gross ton, delivered consumers' yards, for heavy melting steel, and it is reported that some buyers are willing to pay a premium for the best grade. Stocks of scrap in mill yards are said to be low when it is considered that steel-making capacities are fully engaged. Some brokers are gathering carloads of low phosphorus grades, which normally go to steel foundries, for shipment to steel mills. All told, there is every indication that the supply of heavy tonnage grades is barely meeting current demand. The Santa Fe received $14.85 a net ton, on tracks, for No. 2 wrought. Following many weeks of over-supply and weakness in prices, cast iron borings have advanced 50c. a ton on recent heavy sales at $11 a gross ton, delivered. This change has come about in the face of stubborn resistance on the part of buyers. Sellers report that shipments so far in April have run well ahead of those in March, which were unusually heavy. Moderate weather appears to have made little difference in the volume of scrap moving into Chicago from the country. In the face of a persistent demand, coil springs are scarce, and the supply of short rails does not quite meet the needs of users. Demand from all types of foundries is the best in three or four years, and many substitutions of grades are being accepted in an effort to obtain deliveries desired. The Pennsylvania is offering 20,000 tons of scrap; the Great Northern, 5000 tons; the Rock Island, 6000 tons; the Northern Pacific, 2000 tons; the Pullman Car & Mfg. Corporation, 10 carloads, and the Standard Oil Co. of Indiana, 600 tons.

Prices deliv'd Chicago district consumers:

Per Gross Ton

Basic Open-Hearth Grades:	
Heavy melting steel	$16.00 to $16.50
Shoveling steel	16.00 to 16.50
Frogs, switches and guards, cut apart, and misc. rails	17.00 to 17.50
Hydraul. compressed sheets	14.50 to 15.00
Drop forge flashings	12.00 to 13.00
Forg'd cast and r'l'd steel carwheels	19.00 to 19.50
Railroad tires, charg. box size	19.00 to 19.50
Railroad leaf spring cut apart	19.00 to 19.50
Acid Open-Hearth Grades:	
Steel couplers and knuckles	17.00 to 17.50
Coil springs	20.00 to 20.50
Electric Furnace Grades:	
Axle turnings	16.00 to 16.50
Low phos. punchings	17.50 to 18.00
Low phos. plate, 12 in. and under	17.50 to 18.00
Blast Furnace Grades:	
Axle turnings	11.25 to 11.75
Cast iron borings	10.50 to 11.00
Short shoveling turnings	10.50 to 11.00
Machine shop turnings	7.50 to 8.00
Rolling Mill Grades:	
Iron rails	16.00 to 16.50
Rerolling rails	17.50 to 18.00
Cupola Grades:	
Steel rails less than 3 ft.	19.00 to 19.50
Steel rails less than 2 ft.	20.00 to 20.50
Angle bars, steel	17.50 to 18.00
Cast iron carwheels	14.50 to 15.00
Malleable Grades:	
Railroad	19.50 to 20.00
Agricultural	16.50 to 17.00
Miscellaneous:	
*Relaying rails, 56 to 60 lb.	23.00 to 25.00
*Relaying rails, 65 lb. and heav.	26.00 to 31.00

Per Net Ton

Rolling Mill Grades:	
Iron angles and splice bars	15.00 to 15.50
Iron arch bars and transoms	21.25 to 21.75
Iron car axles	27.50 to 28.00
Steel car axles	17.50 to 18.00
No. 1 railroad wrought	14.00 to 14.50
No. 2 railroad wrought	14.25 to 14.75
No. 1 busheling	12.25 to 12.75
No. 2 busheling	7.00 to 7.50
Locomotive tires, smooth	14.50 to 15.00
Pipes and flues	10.00 to 10.50
Cupola Grades:	
No. 1 machinery cast	16.00 to 16.50
No. 1 railroad cast	15.50 to 16.00
No. 1 agricultural cast	14.50 to 15.00
Stove plate	12.75 to 13.25
Grate bars	13.50 to 14.00
Brake shoes	12.50 to 13.00

*Relaying rails, including angle bars to match, are quoted f.o.b. dealers' yards.

Reinforcing Bars.—Shipments of reinforcing bars from Chicago warehouses are measurably heavier, and shops are preparing for larger output following releases against recent awards. Inquiry continues to expand, the pending list giving promise of larger shipments as spring advances. Prices for mild steel reinforcing bars are strong. Most quotations made prior to April 1 at 2.35c. a lb. have been withdrawn and new bids have been submitted at 2.40c. a lb., Chicago warehouses, for carload lots. Prices for rail steel bars lean toward the weak side, though much of the going tonnage is being taken at 2.05c. a lb.

Bolts, Nuts and Rivets.—Specifications from railroads and general manufacturing lines are steady. Tractor plants and harvesting machinery works are busy, but specifications are lighter from manufacturers of tillage machinery, this being their dull season.

Coke.—Prices are firm at $8 a ton, f.o.b. local ovens, or $8.75, delivered in the Chicago switching district.

Warehouse Prices, f.o.b. Chicago

	Base per Lb.
Plates and structural shapes	3.10c.
Soft steel bars	3.00c.
Reinforc'g bars, billet steel	2.35c. to 2.40c.
Reinforc'g bars, rail steel	2.00c. to 2.05c.
Cold-fin. steel bars and shafting—	
Rounds and hexagons	3.60c.
Flats and squares	4.10c.
Bands (¼ in. in Nos. 10 and 12 gages)	3.20c.
Hoops (No. 14 gage and lighter)	3.75c.
Black sheets (No. 24)	3.80c.
Galv. sheets (No. 24)	4.65c.
Blue ann'l'd sheets (No. 10)	3.35c.
Spikes, stand. railroad	3.55c.
Track bolts	4.55c.
Rivets, structural	3.80c.
Rivets, boiler	3.80c.
	Per Cent Off List
Machine bolts	60
Carriage bolts	60
Coach or lag screws	60
Hot-pressed nuts, sq., tap. or blank	60
Hot-pressed nuts, hex., tap. or blank	60
No. 8 black ann'l'd wire, per 100 lb.	$3.30
Com. wire nails, base per keg	3.20
Cement c't'd nails, base per keg	3.20

Better Orders For Locomotives

Shipments of railroad locomotives from the principal manufacturing plants numbered 35 in March, according to reports received by the Department of Commerce. There were no foreign shipments, for the first time in many months. Four of the units shipped were electric, the remainder being steam. The total was 23 in February and a like number in January. With one exception, however, there was no month in 1928 lower than the current figure.

Unfilled orders at the end of the month were the largest in a long time. The total was 488, compared with 339 at the end of February and as low as 152 at the end of last November. Of the total on March 31 there were 419 steam and 24 electric units for domestic service and 45 steam units for export. The highest total of unfilled orders ever reached was 3216, on Dec. 31, 1917, accounted for by war conditions. Six years ago, March 31, 1923, the total was 2373 units.

Barges Taking 22,000 Tons of Steel Awarded

WASHINGTON, April 9.—Approximately 22,000 tons of steel, plates forming the greater portion, will be required for 40 steel cargo barges for which bids were opened and awards made today by the Inland Waterways Corporation. The contracts were awarded as follows: American Bridge Co., Pittsburgh, 24 barges; Riter-Conley Co., Pittsburgh, 11 barges, and the Midland Barge Co., Midland, Pa., five barges. The craft will ply on the Mississippi River and its tributaries.

Cleveland

Second Quarter Brings Continued Heavy Flow of Steel Specifications—Automobile Industry Still Furnishing Bulk

CLEVELAND, April 9.—The second quarter has started with a continuation of the heavy demand for finished steel. While one or two producers report a slight decrease in pressure for deliveries, others entered more tonnage during the past week than in the corresponding period of March. As most consumers are under contract, the greater part of the business was in specifications against contracts taken at second quarter prices. With the heavy production, shipments on most products are about equal to incoming orders, so that mills are not getting further behind on deliveries. The demand for steel bars is breaking all records, and orders for sheets and hot-rolled strip are taxing the capacity of most mills. The automotive industry is furnishing most of the tonnage. With the record-breaking production of motor cars through the first quarter and no scaling down in April production schedules, the steel industry is wondering how long the automobile manufacturers can maintain their present rate of operation. There are as yet no evidences of curtailment, and some of the mills have enough business on their books from that source to carry them well through the present quarter.

Structural material is in good demand from manufacturing plants, but not much inquiry is coming out in the building field. Heavy plates are not as active as recently in this territory, where boiler shops are not very busy. The Lake shipbuilding industry is inactive.

The Cleveland Railway Co. is inquiring for 500 tons of standard 100-lb. rails. Prices are firm.

Steel bars are quoted at 1.95c. to 2c., either delivered Cleveland or with Cleveland as the basing point, and plates and structural material are 1.95c., Pittsburgh.

Pig Iron.—Buying dropped off the past week, during which Cleveland interests sold 27,000 tons, compared with 63,000 tons in the previous week, when a number of sales in foundry and malleable grades were made for third quarter delivery. Business the past week came, for the most part, from the smaller consumers, who had been slower in covering for the second quarter than the large buyers. While none of the sales was for the third quarter, some of the contracts were for deliveries extending into that quarter. The automotive industry is not showing interest in covering for the third quarter, evidently waiting until it is able to determine better than it can at present the extent of its operations and its pig iron requirements for that quarter. An inquiry for 5000 tons of basic iron for shipment to an Ohio consumer came out during the week, but failed to develop a quotation below $18 and did not result in a sale. The market is firm at recent price levels. Cleveland furnaces quote foundry and malleable iron at $18.50 furnace, for outside shipment and at $19 for local delivery. One Lake furnace interest is holding to $19 for shipment to western Ohio and Indiana. In Michigan, $20, furnace, is the ruling price on foundry and malleable grades. There is no letup in the heavy volume of shipments.

Prices per gross ton at Cleveland:

N'th'n fdy., sil. 1.75 to 2.25	$19.50
S'th'n fdy., 1.75 to 2.25	21.50
Malleable	19.50
Ohio silvery, 8 per cent	29.00
Basic Valley furnace	18.00
Stand. low phos., Valley	$26.50 to 27.00

Prices, except on basic and low phosphorus, are delivered Cleveland. Freight rates: 50c. from local furnaces; $3 from Jackson, Ohio; $6 from Birmingham.

Iron Ore.—There has been considerable activity in the market the past week, several open market sales in good-sized lots having been made. Some of the ore firms have sold about all the ore in the better grades that they will be able to mine for shipment this season. Activity has subsided in the past day or two, as most open market buyers, with the exception of the Ford Motor Co., have closed for their requirements for the season, and that company is expected to buy this week. The balance of Lake Superior ore on docks April 1 was 4,223,348 tons, or 1,344,750 tons less than on the same date a year ago. March shipments from docks to furnaces amounted to 762,457 tons, compared with 426,008 tons during the same month last year.

Strip Steel.—Specifications for hot-rolled strip have not been quite as heavy the past week as previously, but mills have large tonnages on their books against second quarter contracts and some are fully committed until late in June. The market is firm. One producer is asking $2 a ton above regular prices for lots of less than five tons. Specifications for cold-rolled strip against second quarter contracts carrying the new extras continue good, and mills are booked four weeks or longer. The market is firm at 2.75c., Cleveland, with some small lots bringing $2 a ton more.

Sheets.—Orders are holding up to recent heavy volume, and deliveries by some of the mills have become more extended. One producer cannot promise shipments of black sheets in some of the finished grades or auto body sheets until late in July. There is a heavy demand from makers of factory equipment; stove manufacturers are also specifying freely. While consumers not under contract are having difficulty in placing orders for early shipment, most buyers have anticipated their requirements and have ordered far enough ahead to get deliveries about as soon as needed. In spite of the heavy order books, occasional concessions of $2 a ton from the second quarter prices are still reported on black and galvanized sheets. This is particularly true of the latter, for which the demand is not very active and on which a quotation below 3.70c., Valley, is reported.

Semi-Finished Steel.—Sheet mills are pressing for sheet bar deliveries, and a local mill is fully engaged for 30 days. Some new inquiry is coming out, but supplies are not available. The situation in respect to billets and slabs is not quite as acute as on sheet bars.

Old Material.—While mills continue to take heavy shipments, the supply of steel scrap is plentiful. Although prices are unchanged, they are not quite as firm as they have been, dealers being able occasionally to buy small lots at slight concessions from regular quotations. In the Valley district, heavy melting steel is bringing $18 to $18.25 from dealers. No new buying by mills is reported. The first cargo of scrap to be shipped by water from Detroit this season is scheduled to come to a Cleveland mill this week.

Prices per gross ton delivered consumers' yards:

Basic Open-Hearth Grades		
No. 1 heavy melting steel	$15.50 to	$16.00
No. 2 heavy melting steel	15.00 to	15.50
Compressed sheet steel	15.00 to	15.50
Light bundled sheet stampings	12.00 to	12.50
Drop forge flashings	13.00 to	13.25
Machine shop turnings	9.75 to	10.00
No. 1 railroad wrought	13.25 to	13.50
No. 2 railroad wrought	16.00 to	16.50
No. 1 busheling	12.50 to	13.00
Pipes and flues	9.00 to	9.50
Steel axle turnings	12.50 to	13.00
Acid Open-Hearth Grades		
Low phos., forging crops	18.50 to	19.00
Low phos., billet, bloom and slab crops	18.50 to	19.00
Low phos. sheet bar crops	18.00 to	18.50
Low phos. plate scrap	18.00 to	18.50
Blast Furnace Grades		
Cast iron borings	11.50 to	11.75
Mixed borings and short turnings	11.50 to	11.75
No. 2 busheling	11.50 to	11.75
Cupola Grades		
No. 1 cast	16.75 to	17.25
Railroad grate bars	11.00 to	12.00
Stove plate	12.00 to	12.50
Rails under 3 ft	16.75 to	17.25
Miscellaneous		
Railroad malleable	16.00 to	16.50
Rails for rolling	16.25 to	16.50

Wire Products.—Plain wire is moving better than recently and is in good demand from the automotive and other manufacturing industries. The

Warehouse Prices, f.o.b. Cleveland

	Base per Lb.
Plates and struc. shapes	3.00c.
Soft steel bars	3.00c.
Reinforc. steel bars	2.25c. to 2.50c.
Cold-fin. rounds and hex	3.65c.
Cold-fin. flats and sq.	4.15c.
Hoops and bands, No. 12 to ¼ in., inclusive	3.25c.
Hoops and bands, No. 13 and lighter	3.65c.
Cold-finished strip	*5.95c.
Black sheets (No. 24)	3.70c.
Galvanized sheets (No. 24)	4.55c.
Blue ann'l'd sheets (No. 10)	3.25c.
No. 9 ann'l'd wire, per 100 lb.	$2.95
No. 9 gal. wire, per 100 lb.	3.40
Com. wire nails, base per keg	2.95

*Net base, including boxing and cutting to length.

price is firm at 2.50c., Cleveland. Nails are moving rather slowly, as jobbers still have good stocks taken at the former prices.

Warehouse Business. — Deferred mill deliveries are helping warehouse business, which is good. Stimulated by the seasonal demand, galvanized sheets are moving better than for some time. Aside from irregularities on sheets, prices are firm.

Coke.—New demand for foundry coke is fair and specifications are good. Prices on Connellsville foundry coke range from $3.75 to $4.85, with good brands available at $4. Ohio by-product coke is unchanged at $8.25, Painesville.

New York

Pig Iron Sales Decline—Higher Prices Not Fully Established—Plate Deliveries Lengthening

NEW YORK, April 9.—The pig iron market is still in a transitional stage. Melters, to a large extent, have covered their second quarter needs, and those who still have iron to buy hesitate to place orders at advanced prices. Bookings for the week probably did not exceed 8000 tons. While asking prices of a number of furnaces range from $18 to $19, base Buffalo, for foundry grade, recent sales indicate that $17.50 to $17.75 is closer to the actual market. The stiffening of prices by furnaces in the North has resulted in more aggressive selling by Alabama producers. A number of sales of Southern iron have been made in this district, including one of 500 tons of No. 1X. This grade is said to be difficult to obtain from furnaces that commonly serve this district. Alabama producers recently reduced prices on foundry iron to $15.50, base Birmingham, and in some instances have shaded that figure. The rail rate from Birmingham to seaport is $3.37 and the water rate to New York is about $3 a ton. One or two Buffalo district producers are reported to have closed contracts for barge space for shipments during the coming season to Beacon, N. Y., and Jersey City, N. J. Barge lines are asking $2 a ton on shipments to those points when the iron is to continue to final destination by rail. The New York Air Brake Co. is inquiring for 1500 tons of malleable and 500 tons of foundry for Watertown, N. Y., with deliveries extending from May and June virtually through the third quarter. The A. P. Smith Mfg. Co., East Orange, N. J., has closed for 600 tons of foundry iron.

Prices per gross ton, delivered New York district:

Buffalo No. 2 fdy., sil. 1.75 to 2.25	$22.41 to $23.91
*Buf. No. 2, del'd east. N. J.	20.78 to 22.28
East. Pa. No. 2 fdy., sil. 1.75 to 2.25	20.89 to 22.02
East. Pa. No. 2X fdy., sil. 2.25 to 2.75	21.39 to 22.52
East. Pa. No. 1X fdy., sil. 2.75 to 3.25	21.89 to 23.02

Freight rates: $4.91 from Buffalo, $1.39 to $2.52 from eastern Pennsylvania.
*Price delivered to New Jersey cities having rate of $3.28 a ton from Buffalo.

Finished Steel.—The delivery situation, particularly in bars, sheets and strip, continues of paramount importance, and in some respects it is tighter than a few weeks ago. Some consumers of full finished sheets have canvassed the sheet mills without success to obtain reasonably early deliveries, and apparently the best that is offered is late in May or early June. In view of this situation, sheet prices have strengthened. While a large part of the unshipped tonnage on mill books was taken at first quarter prices, it is apparent today that few, if any mills, are willing to consider sales at less than the second quarter prices, which are 2.95c. for black, 3.70c. for galvanized and 2.20c. for blue annealed, Pittsburgh base. Eastern plate mills are more heavily booked than they have been at any time this year, one or two having declined to promise shipments earlier than the last week of April or the first week in May. Plate prices are now firmly established at 2.05c., Coatesville. Construction work of the type that requires fabricated steel continues to develop in large volume, and plans have been filed for many large buildings in New York which have not yet been bid on by the fabricators. Most of the structural shops have good backlogs and are inclined to quote firmer prices. Structural mills are extremely busy, and the March production of one large Eastern producer may be exceeded this month.

Mill prices per lb., deliv'd New York: Soft steel bars, 2.29c.; plates, 2.22½c.; structural shapes, 2.19½c.; bar iron, 2.14c.

Cast Iron Pipe.—Prices are less firm, and on some recent tonnages Northern makers have quoted $35 and $36 per net ton, f.o.b. foundry. Award has not yet been announced by Albany, N. Y., on about 39,000 tons of 42 and 48-in. water pipe, on which the United States Cast Iron Pipe & Foundry Co. was low bidder for the entire contract. New York City opens bids April 10 on about 40 tons of pipe and 150 tons of fittings. Most of the current buying of cast iron pipe is confined to lots of a carload or less. Competition is keen.

Prices per net ton deliv'd New York: Water pipe, 6-in. and larger, $37.60 to $39.60; 4-in. and 5-in., $42.60 to $44.60; 3-in., $52.60 to $54.60. Class A and gas pipe, $3 extra.

Warehouse Business.—The improvement in demand for material from stock, which began toward the end of March, is continuing, and April promises to be one of the best months so far this year. Demand for structural steel is active, and sales of reinforcing bars are increasing in both number and tonnage. Sheets are only moderately active, but prices are maintained with only occasional concessions.

Coke.—Standard furnace grade is less firm than a week ago and quotable at $2.75 to $2.85 per net ton, Connellsville. Foundry coke is unchanged at $3.50 to $3.75 per net ton, Connellsville. Special brands of foundry coke are quoted at $4.85 per net ton, ovens, or $8.56, delivered to northern New

Warehouse Prices, f.o.b. New York

	Base per Lb.
Plates and structural shapes	3.30c.
Soft steel bars, small shapes	3.25c.
Iron bars	3.24c.
Iron bars, Swed. charcoal	7.00c. to 7.25c.
Cold-fin. shafting and screw stock—	
Rounds and hexagons	3.60c.
Flats and squares	4.10c.
Cold-roll. strip, soft and quarter hard	5.15c. to 5.40c.
Hoops	4.25c.
Bands	3.75c.
Blue ann'l'd sheets (No. 10)	3.85c. to 3.90c.
Long terne sheets (No. 24)	5.80c.
Standard tool steel	12.00c.
Wire, black annealed	4.50c.
Wire, galv. annealed	5.15c.
Tire steel, 1½ x ½ in. and larger	3.30c.
Smooth finish, 1 to 2½ x ¼ in. and larger	3.65c.
Open-hearth spring steel, bases,	4.50c. to 7.00c.

	Per Cent Off List
Machine bolts, cut thread:	
¾ x 6 in. and smaller	60
1 x 30 in. and smaller	50 to 50 and 10
Carriage bolts, cut thread:	
½ x 6 in. and smaller	60
¾ x 20 in. and smaller	50 to 50 and 10
Coach screws:	
½ x 6 in. and smaller	60
1 x 16 in. and smaller	50 to 50 and 10

	Per 100 Ft.
Boiler Tubes—	
Lap welded, 2-in.	$17.33
Seamless steel, 2-in.	20.24
Charcoal iron, 2-in.	25.00
Charcoal iron, 4-in.	67.00

Discounts on Welded Pipe

Standard Steel—	Black	Galv.
½-in. butt	46	29
¾-in. butt	51	37
1-3-in. butt	53	39
2½-6-in. lap	48	35
7 and 8-in. lap	44	17
11 and 12-in. lap	37	12
Wrought Iron—		
½-in. butt	5	+19
¾-in. butt	11	+ 9
1-1½-in. butt	14	+ 6
2-in. lap	5	+14
3-6-in. lap	11	+ 6
7-12-in. lap	3	+16

Tin Plate (14 x 20 in.)

	Prime	Seconds
Coke, 100 lb. base box	$6.45	$6.20
Charcoal, per Box—	A	AAA
IC	$9.70	$12.10
IX	12.00	14.25
IXX	13.90	16.00

Terne Plate (14 x 20 in.)

IC—20-lb. coating	$10.00 to $11.00
IC—30-lb. coating	12.00 to 13.00
IC—40-lb. coating	13.75 to 14.25

Sheets, Box Annealed—Black, C. R. One Pass

	Per Lb.
Nos. 18 to 20	3.80c.
No. 22	3.95c.
No. 24	4.00c.
No. 26	4.10c.
No. 28*	4.25c.
No. 30	4.50c.

Sheets, Galvanized

	Per Lb.
No. 14	4.40c.
No. 16	4.25c.
No. 18	4.40c.
No. 20	4.50c.
No. 22	4.60c.
No. 24	4.75c.
No. 26	5.00c.
No. 28*	5.25c.
No. 30	5.65c.

*No. 28 and lighter, 36 in. wide, 20c. higher per 100 lb.

Jersey, Jersey City and Newark, and $9.44 to New York and Brooklyn. By-product coke is quoted at $9 to $9.40 per net ton, Newark or Jersey City, and $10.06, New York or Brooklyn.

Reinforcing Bars.—Lettings for the week were of moderate size, in no case exceeding 300 tons. Considerable tonnage is pending.

Billet steel reinforcing bars in 40, 50 and 60-ft. lengths, 2.05c. per lb., Pittsburgh, and 2.30c. per lb., Pittsburgh warehouse, for cut lengths. Out of New York warehouse, 2.90c. per lb. for lots of 5 tons or more, 3.05c. for lots of 2 to 5 tons and 3.30c. for less than 2 tons, all delivered at job.

Old Material.—Buying prices for all grades are substantially unchanged since last week. Only a moderate tonnage of scrap is moving to eastern Pennsylvania. Some consumers, especially users of No. 2 heavy melting steel, are not receiving as much tonnage on their contracts as they could use. No. 2 steel is still being diverted to the Pittsburgh district, where brokers are offering $16.30 per ton, delivered, or $11 per ton, New York, while $13.50 per ton, delivered, or $10 per ton, New York, is offered for eastern Pennsylvania delivery. Sellers are asking $18 per ton, delivered eastern Pennsylvania, as a minimum for No. 1 steel contracts, but no purchases have been made by eastern Pennsylvania users. Railroad lists to be opened this week include the Pennsylvania Railroad, about 45,000 tons; Lehigh Valley Railroad, about 3000 tons, and the Central Railroad of New Jersey, about 2000 tons.

Dealers' buying prices per gross ton, f.o.b. New York:

No. 1 heavy melting steel	$12.85 to $14.00
Heavy melting steel (yard)	8.50 to 9.75
No. 1 hvy. breakable cast.	12.00 to 12.50
Stove plate (steel works)	9.00 to 9.50
Locomotive grate bars	9.00 to 9.50
Machine shop turnings	7.75 to 8.00
Short shoveling turnings	7.75 to 8.00
Cast borings (blast furn. or steel works)	7.00 to 7.25
Mixed borings and turnings	6.25 to 6.50
Steel car axles	19.25 to 19.75
Iron car axles	24.50 to 25.00
Iron and steel pipe (1 in. dia., not under 2 ft. long)	11.75
Forge fire	10.50 to 10.75
No. 1 railroad wrought	12.50 to 13.00
No. 1 yard wrought, long	11.50 to 12.00
Rails for rolling	13.50 to 14.00
Cast iron carwheels	12.50 to 12.75
Stove plate (foundry)	9.00 to 9.50
Malleable cast (railroad)	14.00 to 14.50
Cast borings (chemical)	10.50 to 11.00

Prices per gross ton, deliv'd local foundries:

No. 1 machry. cast	$17.00
No. 1 hvy. cast (columns, bldg. materials, etc.), cupola size	15.00
No. 2 cast (radiators, cast boilers, etc.)	14.50

High Wages in New York State Factories

Average weekly earnings in representative New York State factories in February are reported at $29.99 by the State Industrial Commissioner. With the exception of last December, when the average was $30.12, this is the highest figure on record. It compares with $29.71 in January and with $29.16 in February, 1928. It is $1.20 higher than the low point of 1928, which was reported in April.

Philadelphia

Steel Deliveries Becoming Extended — Shape Prices Stiffening—Southern Pig Iron Coming North

PHILADELPHIA, April 9.—Mills are booked with sufficient steel tonnage to carry them well into the present quarter. Bar mills are offering no better delivery than five to six weeks on certain sizes. On most other steel products deliveries range from two to four weeks. Buyers, unaccustomed to waiting more than a week to 10 days for shipments, are pressing for delivery on their current contracts. Plate and bar prices are decidedly firm, and quotations on structural shapes are maintained better than a fortnight ago, although they are still $1 to $2 a ton less than the scheduled price for this quarter. Sheet mills are well sold up, and delays in deliveries of blue annealed and black sheets, in some cases extending to three or four weeks, are attributed to heavy bookings of automobile body stock. Galvanized sheet prices continue rather generally at $1 to $2 a ton lower than the announced price for second quarter, and concessions on black sheets are not uncommon.

Pig Iron.—Eastern Pennsylvania furnaces are maintaining $21 per ton, furnace, on foundry iron and show no inclination to offer concessions from this price. Buffalo sellers are no longer competitors in the eastern Pennsylvania district, but Southern foundry iron at $15.50 per ton, Birmingham, has been appearing in nearby districts. Recently some transactions in Birmingham iron are reported to have been made in Baltimore and small tonnages have moved to Burlington, N. J., and into the New York district. In the past week, small consumers of foundry iron have been active buyers, closing for a total of 4000 to 5000 tons with eastern Pennsylvania furnaces. Basic iron continues quiet, and there is little buying of low phosphorus.

Prices per gross ton at Philadelphia:

East. Pa. No. 2, 1.75 to 2.25 sil.	$21.76
East. Pa. No. 2X, 2.25 to 2.75 sil.	22.26
East. Pa. No. 1X	22.76
Basic (del'd east. Pa.)	$20.25 to 20.50
Gray forge	20.50 to 21.00
Malleable	21.25 to 21.75
Stand. low phos. (f.o.b. N. Y. State furnace)	22.00 to 23.00
Cop. b'r'g low phos. (f.o.b. furnace)	23.50 to 24.00
Va. No. 2 plain, 1.75 to 2.25 sil.	24.79
Va. No. 2X, 2.25 to 2.75 sil.	25.29

Prices, except as specified otherwise, are deliv'd Philadelphia. Freight rates: 76c. to $1.64 from eastern Pennsylvania furnaces; $4.54 from Virginia furnaces.

Billets.—Although consumers were in some instances permitted to overspecify on their first quarter contracts, a considerable tonnage of new business has been placed for second quarter at the $1 a ton advance to $34 per ton, Pittsburgh, for rerolling billets and $39, Pittsburgh, for forging quality.

Bars.—Deliveries range from two to three weeks on certain sizes and from five to six weeks on others. Practically all mills are operating full, contracts from the automotive industry providing a sizable portion of the current rollings. At some mills, bars for automobile builders are estimated to represent about 25 per cent of the total production. Prices are firm at 1.95c., Pittsburgh, or 2.27c., Philadelphia.

Reinforcing Bars.—In addition to a good volume of small inquiry for projects involving less than 100 tons each, about 4000 tons is pending for the Columbia-Wrightsville, Pa., bridge. Bids were opened late today on the general contract for this project. Competition for bar tonnage is keen, and slight concessions occasionally appear on sizable tonnages. Billet steel reinforcing bars in 40, 50 and 60-ft. lengths are quoted at 2.05c., Pittsburgh, or 2.37c., delivered Philadelphia, with a $5 per ton extra for cutting to length.

Shapes.—Concessions in price of $3 a ton and more, offered by eastern Pennsylvania mills about a fortnight ago, have disappeared, but 2.05c., f.o.b. nearest mill to consumer, the price announced for this quarter, applies only on small lots. Most of the current business in shapes is at 1.95c. to 2c., f.o.b. mill, or using Pencoyd, Pa., as a basing point, 2.01c. to 2.06c., delivered Philadelphia. Fabricated projects in the market for bids are increasing, and mills have been securing a better backlog of business, so that deliveries on small sizes often range from two to three weeks. Larger sections, however, are still obtainable for fairly prompt shipment. As part of the electrification program of the Pennsylvania Railroad, 5700 tons of shapes for catenary bridges between

Warehouse Prices, f.o.b. Philadelphia

	Base per Lb.
Plates, ¼-in. and heavier	2.70c.
Plates, ⅜-in.	2.90c.
Structural shapes	2.70c.
Soft steel bars, small shapes, iron bars (except bands)	2.80c.
Round-edge iron	3.50c.
Round-edge steel, iron finished 1½ x 1½ in.	3.50c.
Round-edge steel, planished	4.30c.
Reinforc. steel bars, sq. twisted and deform.	2.60c. to 2.80c.
Cold-fin. steel, rounds and hex.	3.60c.
Cold-fin. steel, sq. and flats	4.10c.
Steel hoops	3.40c.
Steel bands, No. 12 to ⅜-in., inclus.	3.15c.
Spring steel	5.00c.
*Black sheets (No. 24)	4.10c.
†Galvanized sheets (No. 24)	4.85c.
Blue ann'l'd sheets (No. 10)	3.25c
Diam. pat. floor plates—	
¼-in.	5.30c.
⅜-in.	5.50c.
Rails	3.20c.
Swedish iron bars	6.60c.

*For 50 bundles or more: 10 to 49 bun., 4.10c. base; 1 to 9 bun., 4.35c. base.
†For 50 bundles or more; 10 to 49 bun., 4.95c. base; 1 to 9 bun., 5.30c. base.

Trenton and Philadelphia is in the market.

Plates.—Deliveries range from two to four weeks on most sizes of sheared plates, but fairly prompt shipment is obtainable on universal plates. Mills are heavily booked, and are firmly maintaining 2.05c., Coatesville, or 2.15c., delivered Philadelphia. Tonnage is well distributed, a substantial portion coming from railroad car builders and tank and boiler shops. Six ships for the Robert Dollar Line have been awarded, two to the New York Shipbuilding Co. and four to the Newport News Shipbuilding & Dry Dock Co. About 5000 tons of plates will be required for each ship.

Sheets.—Blue annealed sheet prices are being maintained at 2.10c. to 2.20c., Pittsburgh, or 2.42c. to 2.52c., Philadelphia, and deliveries range from two to five weeks. Protracted delivery by some mills is attributed to a heavy tonnage of automobile body sheets on their books. Although most producers have fair backlogs of black and galvanized sheet business, prices still show a tendency to sag from 2.95c., Pittsburgh, or 3.27c., Philadelphia, on black and 3.70c., Pittsburgh, or 4.02c., Philadelphia, on galvanized sheets. Concessions amount to $1 a ton on black and $1 to $2 a ton on galvanized.

Imports.—In the week ended April 6, 39 tons of pig iron arrived at this port from Norway. Steel imports were 178 tons of steel bands, 279 tons of structural shapes and 91 tons of steel bars from Germany, 89 tons of steel bands, 79 tons of structural shapes, 39 tons of steel bars and 53 tons of iron bars from Belgium, and 10 tons of galvanized steel strips from the United Kingdom.

Old Material.—In the absence of buying by eastern Pennsylvania consumers, prices are substantially unchanged from last week. Sellers are seeking advances for new contracts, but consumers still delay buying. On new contracts for No. 1 heavy melting steel, $18 per ton, and in some cases $18.50 per ton, is asked by brokers, but prospective buyers are still unwilling to pay more than $17.50. Purchase of a substantial tonnage of No. 1 heavy melting steel is expected this week. Heavy breakable cast has been bought by a Florence, N. J., consumer at $16.50 per ton, although a Coatesville, Pa., consumer has bought a few carloads at $15.50 per ton, delivered. On contracts, most dealers are asking a minimum of $16 per ton for heavy breakable cast.

Prices per gross ton delivered consumers' yards, Philadelphia district:

No. 1 heavy melting steel	$17.00 to	$17.50
Scrap T rails	15.50 to	16.00
No. 2 heavy melting steel	12.50 to	13.50
No. 1 railroad wrought	16.00 to	16.50
Bundled sheets (for steel works)	11.50 to	12.00
Hydraulic compressed, new	15.00 to	16.00
Hydraulic compressed, old	13.00 to	13.50
Machine shop turnings (for steel works)	11.50 to	12.00
Heavy axle turnings (or equiv.)	14.00 to	14.50
Cast borings (for steel works and roll. mill)	11.00 to	11.50
Heavy breakable cast (for steel works)	16.00 to	16.50
Railroad grate bars	13.00 to	13.50
Stove plate (for steel works)	13.00 to	13.50
No. 1 low phos., hvy., 0.04% and under	21.00 to	22.00
Couplers and knuckles	19.50 to	20.50
Rolled steel wheels	19.50 to	20.50
No. 1 blast f'nace scrap	10.00 to	10.50
Wrot. iron and soft steel pipes and tubes (new specific.)		15.50
Shafting	19.00 to	20.00
Steel axles	23.00 to	23.50
No. 1 forge fire	14.00 to	14.50
Cast iron carwheels		16.50
No. 1 cast	16.50 to	17.00
Cast borings (for chem. plant)		15.00
Steel rails for rolling	17.00 to	17.50

Smaller Ore Supply at Lake Erie Ports

Dock balances of Lake ores at Lake Erie ports on April 1 are reported by the Lake Superior Iron Ore Association at 4,223,348 gross tons, compared with 5,568,098 tons, April 1, 1928, and with 5,239,687 tons, April 1, 1927. The largest decline was at Ashtabula, where a reduction of 617,000 tons was reported. Other reductions included 151,000 tons at Conneaut, 245,000 tons at Cleveland, 139,000 tons at Fairport and smaller figures for other ports.

Receipts for last season at the Lake Erie ports totaled 36,956,342 tons, or about 1 per cent more than the 1927 receipts of 36,552,791 tons. Shipments for the season, which do not include figures for the Lake-front furnaces—these appearing only in the receipts column—were 28,418,913 tons, or nearly 4 per cent more than the 27,436,280 tons of 1927.

Shipments were greater than receipts at Erie, Conneaut, Ashtabula, Fairport and Huron. Receipts of the Buffalo district, however, were 4,300,000 tons greater than shipments, while the Cleveland district showed receipts 3,000,000 tons greater than shipments, Lorain 1,700,000 tons and Toledo 643,000 tons in excess of receipts.

Better Employment and Wages in Steel Industry

Wage earners in 206 establishments in the iron and steel group reported upon by the United States Bureau of Labor Statistics increased 0.6 per cent in February, compared with January. The numbers were 273,186 in January and 274,772 in February, for the same establishments. Meanwhile, the amount of a week's payroll had advanced 4.9 per cent, from $8,575,202 to $8,991,985.

Similar conditions were prevalent throughout most of the industries making their products from iron and steel, with the exception of the cast iron pipe plants, which showed a decrease of 5.8 per cent in employees, but an increase of 4.9 per cent in amount of payroll.

Foundry and machine shop plants to the number of 985 showed a gain of 3.8 per cent in employees, from 255,600 to 265,372. Correspondingly, there was an increase in amount of payroll of 9.2 per cent, from $7,637,470 to $8,341,360. Machine tool plants showed a gain of 3.5 per cent in number and 6.9 per cent in amount of payroll.

Plants making steam fittings and steam and hot-water heating apparatus gained 3.8 per cent in employees and 12.2 per cent in payroll. Establishments making stoves showed an increase of 9.1 per cent in number and 15.5 per cent in amount of payroll. Hardware manufacturers gained 2.8 per cent in number and 6.5 per cent in amount of payroll.

Much Less Coal Mined in March

Bituminous coal mined in March is reported by the United States Bureau of Mines at 39,210,000 net tons, which is a reduction of more than 16 per cent from the 47,271,000 tons in the shorter month of February. On the daily basis the shrinkage was from 1,970,000 tons to 1,508,000 tons. Similarly, there was a reduction of one-third in the daily output of anthracite, which dropped for the month from 6,670,000 tons to 4,950,000 tons.

Beehive coke showed an opposite tendency, advancing from 440,200 tons in February to 542,800 tons in March. The daily average went up from 18,342 tons to 20,876 tons.

Shipments of Sheet-Metal Ware Show Decline

February shipments of enameled sheet-metal ware by 18 manufacturers are reported by the Department of Commerce at 390,577 dozens, valued at $1,402,858. This compares with 427,871 dozens in January, valued at $1,404,048, and with 372,848 dozens in February, 1928, valued at $1,459,188.

Following a tendency of the past year or more, the shipments of colored goods have been relatively high at the expense of the white and gray goods. Colored goods shipped in the first two months amounted to 170,584 dozens, compared with 94,132 dozens in the first two months of 1928 and 32,388 dozens in the first two months of 1927.

Galvanized sheet-metal ware shipped by 15 concerns amounted to 214,142 dozens in February, valued at $799,729. This shows an increase over January, with 206,394 dozens, valued at $779,600, and over February, 1928, with 201,830 dozens, valued at $735,878.

Great Britain supplied 63 per cent, the United States 24 per cent and Germany 6 per cent of the industrial machinery imported into the Union of South Africa in 1927, according to a report prepared by L. J. Cochrane, Industrial Machinery Division, Department of Commerce.

Pacific Coast

Structural Steel Awards Lead in Week's Business—7,000 Tons in New Projects

SAN FRANCISCO, April 6 (*By Air Mail*).—Demand for most forms of iron and steel products is fair. Structural shape awards were the heaviest. A number of new structural projects calling for over 7000 tons have come up for figures during the past 10 days. The steel price structure is now on a fairly firm basis.

Building permits issued during March in the five leading cities on the Pacific Coast were as follows: Los Angeles, $10,695,375; Seattle, $4,764,625; San Francisco, $2,701,111; Oakland, $1,896,240; Portland, $1,274,725.

Pig Iron.—Consumers apparently have sufficient stocks in foundry yards to take care of nearby requirements and are not anticipating their needs.

Prices per gross ton at San Francisco:

*Utah basic	$25.00 to $26.00
*Utah fdy., sil. 2.75 to 3.25	25.00 to 26.00
**Indian fdy., sil. 2.75 to 3.25	24.00 to 25.00

*Delivered San Francisco.
**Duty paid, f.o.b. cars San Francisco.

Bars.—Among the larger lots of reinforcing steel bars placed during the week were 185 tons for a bridge in Seattle, 150 tons for a hotel at Wenatchee, Wash., and 325 tons for two apartment houses in Los Angeles. Bids were opened this week on 490 tons for a school in San Francisco and on 400 tons for a bridge at Tacoma. Prices continue to range from 2.20c. to 2.30c., base, on carload lots of out-of-stock material and up to 2.60c. on smaller lots. Merchant bars continue firm at 2.35c., c.i.f. Coast ports

Plates.—The only plate award of importance was 1000 tons for the Pacific Car & Foundry Co., Seattle, which placed part of the business with Eastern mills and the universal plates with the Pacific Coast Steel Co. at Seattle. Bids will be opened next week on 240 tons for Sierra Madre, Cal. Plate prices continue to be quoted at 2.35c., c.i.f.

Shapes.—Lettings of fabricated steel this week included 1500 tons for a theater in Los Angeles, placed with the McClintic-Marshall Co., and 1000 tons for the Pacific Car & Foundry Co., Seattle, booked by Eastern and Coast producers. A number of new projects have come up for figures and include 2000 tons each for the May Department Store and the Federal Reserve Bank in Los Angeles and 500 tons for a hospital in the same city. The Pacific Coast Engineering Co. was low bidder on 444 tons for a warehouse in Oakland for the Port Commission. Plain material is firm at 2.35c., c.i.f.

Cast Iron Pipe.—Among the cast iron pipe awards of the week were 667 tons of 4 to 12-in. Class B for Tweedy Park, South Gate, Cal., placed with George H. Oswald, and 324 tons of 10 and 20-in. Classes B and C pipe for Wenatchee, Wash., booked by the United States Cast Iron Pipe & Foundry Co. San Bernardino, Cal., awarded 275 tons of 4 to 8-in. Class 250 pipe to the Pacific States Cast Iron Pipe Co. and 50 tons of 18-in. Class 100 pipe to the United States Cast Iron Pipe & Foundry Co. Bids are to be opened April 9 on 819 tons of 4 to 16-in. Class 150 or riveted or welded pipe for Sierra Madre, Cal., and bids were opened this week on 404 tons of 6 and 8-in. Class B for Sacramento, Cal., previous bids having been rejected.

Steel Pipe.—The Southern Pacific Co., San Francisco, placed 903 tons of 12¾-in. O. D. lapweld tubing with an unnamed interest. This company originally called for bids on 2242 tons of 12-in. Classes A, B and C cast iron pipe. Oil country goods continue in good demand, but no large pipe line inquiries are current.

Warehouse Prices, f.o.b. San Francisco

	Base per Lb.
Plates and struc. shapes	3.15c.
Soft steel bars	3.15c.
Small angles, ¼-in. and over	3.15c.
Small angles, under ¼-in.	3.55c.
Small channels and tees, ¾-in. to 2¾-in.	3.75c.
Spring steel, ¼-in. and thicker	5.00c.
Black sheets (No. 24)	4.90c.
Blue ann'l'd sheets (No. 10)	3.80c.
Galv. sheets (No. 24)	5.30c.
Struct. rivets, ½-in. and larger	5.65c.
Com. wire nails, base per keg	$3.40
Cement c't'd nails, 100 lb. keg	3.40

Birmingham

Structural, Bar and Rail Mills Speed Up Operations—Scrap Market Stronger—Pig Iron Steady

BIRMINGHAM, April 9.—A few of the larger users of pig iron are coming into the market to cover their requirements for the second quarter. Buying is being done quietly. Frequent sales are reported to points above the Ohio River. Many of the district melters who place forward contracts have not covered, and there is still a noticeable tendency to buy for immediate needs only. Shipments since April 1 show a little improvement. Prices remain on the basis of $15.50 for No. 2 foundry iron. The Alabama City furnace of the Gulf States Steel Co. was changed from foundry to basic iron on April 1. Nine furnaces are producing foundry iron, eight are on basic and one on recarburizing iron, a total of 18.

Prices per gross ton, f.o.b. Birmingham dist. furnaces:

No. 2 fdy., 1.75 to 2.25 sil.	$15.50
No. 1 fdy., 2.25 to 2.75 sil.	16.00
Basic	15.50

Finished Steel.—Structural bar and rail mills have increased operations since April 1 to supply the demand for these lines. Prices are strong. A letup in sheets is being felt, following one of the best buying periods in several years. Wire and nail business, which has been slow for some time, shows no improvement. Structural steel fabricators have increased operations to fill the heavy bookings of the last week in March. Demand for reinforcing bars is strong, and a number of good projects are in prospect. Open-hearth operations are unchanged, the Tennessee company working seven or eight at Ensley and seven at Fairfield. The Gulf States Steel Co. has five active at Alabama City.

Cast Iron Pipe.—The American Cast Iron Pipe Co. has booked orders for 2000 tons for Akron, Ohio, and 300 tons for Williamstown, Ky. This company is low bidder on 1000 tons of the project at Detroit. The United States Cast Iron Pipe & Foundry Co. has closed a contract for 3000 tons for Louisville, Ky. The McWane Cast Iron Pipe Co. has received an order for 350 tons for Saluda, S. C. The National Cast Iron Pipe Co. will ship 351 tons to Eugene, Ore. The only pending tonnage of consequence in the South is 4100 tons at New Orleans, for which bids will be opened May 1. Plants are shipping all of their current make, with operations varying from 60 to 75 per cent of capacity. Quotations remain at $37 to $38 for the 6-in. and larger diameters, but there have been some variations from these figures.

Coke.—Foundry coke demand is steady at unchanged prices.

Old Material.—Fluctuating demand has brought about several price adjustments. Scrap steel rails have been increased from $12.50 to $13. An advance of $1 a ton has been made on cast iron borings, steel axles and iron axles. No. 1 cast has been reduced 50c. a ton to $14, and stove plate is now being quoted at $13 instead of $13.50. Prices on other lines are the same. Increased buying of scrap steel rails has been the chief improvement in the market during the past week. Dealers are well stocked.

Prices per gross ton, deliv'd Birmingham dist. consumers' yards:

Heavy melting steel		$12.50
Scrap steel rails		13.00
Short shoveling turnings		9.00
Cast iron borings		9.00
Stove plate		13.00
Steel axles		21.00
Iron axles		23.00
No. 1 railroad wrought	$10.00 to	10.50
Rails for rolling	14.00 to	15.00
No. 1 cast		14.00
Tramcar wheels	13.00 to	14.00
Cast iron carwheels	13.00 to	13.50
Cast iron borings, chem.	13.50 to	14.00

The American Institute of Steel Construction, Inc., formerly at 285 Madison Avenue, New York, is now located in the International Combustion Building, 200 Madison Avenue, New York.

Boston

Pig Iron Higher on Small Sales—Buffalo Furnaces Get $18.50 Base—Scrap Still Strong

BOSTON, April 9.—Sales of pig iron in the past week, at about 2000 tons, were not in large enough individual quantities to give the recently announced price advances a severe test, but the higher quotations were obtained on the business done. A Buffalo furnace, which until recently had been quoting on an $18 base, sold 2X iron at $19, furnace, equivalent to $18.50, base. The minimum price received by the Mystic Iron Works on its past week's sales was $20.20, furnace, for silicon 2.00 to 2.20 per cent, which compares with recent sales at $20 for the same grade of iron. Foundries generally are quite well covered for this quarter, so that little activity is expected during the remainder of this month. Little or no interest has been shown in third quarter purchases.

Foundry iron prices per gross ton deliv'd to most New England points:

*Buffalo, sil. 1.75 to 2.25		$22.41 to $23.91
*Buffalo, sil. 2.25 to 2.75	22.91 to	24.41
East. Penn., sil. 1.75 to 2.25	24.15 to	24.65
East. Penn., sil. 2.25 to 2.75	24.65 to	25.15
Va., sil. 1.75 to 2.25		25.21
Va., sil. 2.25 to 2.75		25.71
Ala., sil. 1.75 to 2.25	22.41 to	24.27
Ala., sil. 2.25 to 2.75	22.91 to	24.77

Freight rates: $4.91 all rail from Buffalo; $3.65 from eastern Pennsylvania; $5.21 all rail from Virginia; $6.91 to $8.77 from Alabama.
*All rail rate.

Coke.—Demand for domestic coke is slightly better than a week ago, owing to intervening cold damp days. Foundries are taking by-product fuel fairly liberally. Foundry coke remains at $11 a ton, delivered within a $3.10 freight rate zone.

Cast Iron Pipe.—Framingham, Mass., has closed with the Warren Foundry & Pipe Co. for its 1929 pipe requirements, amounting to about 1000 tons, and Methuen, Mass., bought 1000 tons of 6-in. stock from the United States Cast Iron Pipe Co. R. D. Wood & Co. were low bidders on 450 tons of 6, 8 and 10-in. pipe required by Brookline, Mass., but no award has been made. Natick, Mass., has not decided on the award of 200 tons. Fitchburg, Mass., closed bids on April 8 for 400 tons of 6 to 12-in. pipe. Competition for business is keen, and concessions of as much as $2 a ton have been made on 12-in. and larger diameters. Prices quoted openly on domestic pipe are: 4 in., $47.60 a ton, delivered common Boston freight rate points; 6 to 12-in., $43.60 to $44.10; 16 to 20-in., $42.60 to $43.10. The usual differential of $3 a ton is asked on Class A and gas pipe.

Importations.—Local imports of pig iron in March were 661 tons, consisting of 596 tons of Indian and 65 tons of Scotch, which compares with 1648 tons in February, 558 tons in March, last year, 13,527 tons in March, two years ago, and 10,810 tons in March, 1926. March importations of ore were 5520 tons from Bonoa, Algeria.

Finished Material.—Sales of reinforcing bars in this territory the past week are estimated at not more than 625 tons. Quite a number of small tonnages, ranging from 5 to 75 tons, are being figured. Prices are firm at 2.66½c. per lb., base, from stock. Consumption of merchant bars in New England is on a large scale. The structural steel market is more active, although high money rates continue to hold back construction in this section.

Old Material.—Some owners of old material are still holding out for higher prices; consequently the movement of scrap out of New England shows little, if any, gain. Consumption of foundry scrap, especially of textile cast and No. 1 machinery cast, is increasing. Prices hold very firm. Buying for New England delivery and for export serve to give the market an active appearance. Prices of heavy scrap for domestic consumption are considerably out of line with exporters' ideas; consequently material intended for Danzig is very largely automobile scrap or its equivalent, for which about $10.50 a ton, on dock here, is being paid. One steamer is loading scrap here for export. The steamer Dumfries will load during the latter part of April or early in May and the Ingarto will load before the end of April.

Buying prices per gross ton, f.o.b. Boston rate shipping points:

No. 1 heavy melting steel	$12.75 to $13.00
Scrap T rails	12.25 to 12.75
Scrap girder rails	12.00 to 12.25
No. 1 railroad wrought	12.25 to 12.50
No. 1 yard wrought	9.50 to 10.00
Machine shop turnings	6.50 to 7.00
Cast iron borings (steel works and rolling mill)	6.75 to 7.00
Bundled skeleton, long	9.50 to 10.00
Forge flashings	10.50 to 11.00
Blast furnace borings and turnings	6.50 to 6.75
Forge scrap	9.25 to 9.75
Shafting	14.50 to 14.75
Steel car axles	17.50 to 18.50
Wrought pipe 1 in. in diameter (over 2 ft. long)	11.00 to 11.25
Rails for rolling	13.00 to 13.50
Cast iron borings, chemical	10.00 to 10.50
Prices per gross ton deliv'd consumers' yards:	
Textile cast	$14.50 to $15.00
No. 1 machinery cast	16.00 to 16.50
No. 2 machinery cast	14.00 to 14.50
Stove plate	11.50 to 12.00
Railroad malleable	17.50 to 18.00

Warehouse Prices, f.o.b. Boston

	Base per Lb.
Plates	3.365c.
Structural shapes—	
Angles and beams	3.365c.
Tees	3.365c.
Zees	3.465c.
Soft steel bars, small shapes	3.265c.
Flats, hot-rolled	4.15c.
Reinforcing bars	3.265c. to 3.54c.
Iron bars—	
Refined	3.265c.
Best refined	4.60c.
Norway rounds	6.60c.
Norway squares and flats	7.10c.
Spring steel—	
Open-hearth	5.00c. to 10.00c.
Crucible	12.00c.
Tie steel	4.50c. to 4.75c.
Bands	4.015c. to 5.00c.
Hoop steel	5.50c. to 6.00c.
Cold-rolled steel—	
Rounds and hex	*3.55c. to 5.55c.
Squares and flats	*4.05c. to 7.05c.
Toe calk steel	6.00c.
Rivets, structural or boiler	4.50c.
	Per Cent Off List
Machine bolts	50 and 5
Carriage bolts	50 and 5
Lag screws	50 and 5
Hot-pressed nuts	50 and 5
Cold-punched nuts	50 and 5
Stove bolts	70 and 10

*Including quantity differentials.

Canada

Pig Iron Prices Advanced 50c. a Ton—Structural Steel and Other Lines Continue Active

TORONTO, ONT., April 9.—Business emerges from the winter in a generally healthy condition, says the Canadian Bank of Commerce in its current monthly report. The outstanding features of the last few months have been record exports of Western grain and industrial activity on a scale never equaled in this country. Pig iron production is 45 per cent higher and steel production 19 per cent larger than in the corresponding period last year. This activity is partly attributable to the branch line extension and replacement plans of the two major railroads, but it reflects also the large orders placed for rolling stock and equipment, the requirements of manufacturers of farm implements, automobile and industrial machinery, the need for mining equipment and the increased quantity of steel required for general construction purposes.

The Canadian Pacific Railway Co. is making provision for the expenditure of almost $56,000,000 for new equipment and improvements, according to a statement in its annual report just issued. More than $41,000,000 will be expended for new equipment, while slightly less than $15,000,000 will be appropriated for various capital expenditures. The construction of 1200 miles of branch lines in sections of western Canada is also proposed.

The Algoma Steel Corporation, Sault Ste. Marie, Ont., which has smashed a number of production records lately, announces some new high marks for March. Last month the output of coke was 52,306 tons, compared with the former record of 50,565 tons. Ingot steel produced by the open-hearth department amounted to 50,639 tons, compared with the previous monthly record of 48,799 tons. These figures are exclusive of castings. Ingots rolled on the 36-in. blooming mill amounted to 59,575 tons, against the previous record of 48,777 tons.

Pig Iron.—As a result of the recent

advance in prices in the Buffalo market and the strong demand for pig iron in the Canadian markets, prices in this country have been advanced 50c. per ton, and there are expectations that Canadian prices will go still higher. The demand for merchant iron, while steady, shows no features. Forward buying has practically ceased, but the demand for spot shipment continues at a high level. Melters are placing frequent repeat orders, and spot sales range from 50 to 500 tons. The daily melt continues heavy, most consumers reporting operations from 80 to 100 per cent and sufficient business on their books to maintain present activities for several months.

Prices per gross ton:

Delivered Toronto	
No. 1 fdy., sil. 2.25 to 2.75	$24.10
No. 2 fdy., sil. 1.75 to 2.25	24.10
Malleable	24.10
Delivered Montreal	
No. 1 fdy., sil. 2.25 to 2.75	$25.50 to $26.00
No. 2 fdy., sil. 1.75 to 2.25	25.50 to 26.00
Malleable	25.50 to 26.00
Basic	24.50 to 25.00
Imported Iron, Montreal Warehouse	
Summerlee	$33.50
Carron	33.00

Structural Steel.—Among the outstanding orders was one placed with the Hamilton Bridge Works, Hamilton, Ont., for 12,000 tons for the Canadian Bank of Commerce Building in Toronto. The Dominion Bridge Co., Lachine, Que., has received an order for 2000 tons for Montreal office building for the Sun Life Assurance Co. of Canada; the Reid & Brown Structural Steel & Iron Works, Toronto, has been awarded contract to supply 1000 tons for automotive building for the Canadian National Railways. Small tonnage awards were fairly numerous, and there are many projects on which fabricators are figuring, including several for which from 1000 to 8000 tons of steel will be required. Fabricating plants are well booked up for several months.

Old Material.—Local dealers have marked up their buying prices 50c. to $1 per ton. In the Montreal market price advances were confined to two or three grades. Old material sales continue in good volume.

Dealers' buying prices:

	Per Gross Ton	
	Toronto	Montreal
Heavy melting steel	$9.50	$8.50
Rails, scrap	11.00	9.00
No. 1 wrought	9.50	12.00
Machine shop turnings	7.50	5.00
Boiler plate	7.50	6.00
Heavy axle turnings	8.00	7.50
Cast borings	7.50	5.00
Steel turnings	7.50	6.50
Wrought pipe	5.50	6.00
Steel axles	15.00	20.00
Axles, wrought iron	17.00	22.00
No. 1 machinery cast	....	17.00
Stove plate	....	13.00
Standard carwheels	....	16.00
Malleable	....	13.00
	Per Net Ton	
No. 1 mach'ry cast	$16.00	....
Stove plate	9.50	....
Standard carwheels	14.00	....
Malleable scrap	14.00	....

St. Louis

Third Quarter Pig Iron Orders Being Accepted at Present Prices—Steel Bookings Gain

ST. LOUIS, April 9.—Orders for pig iron for shipment during third quarter are being accepted by the St. Louis Gas & Coke Corporation at prices prevailing now, although the company is making no effort to obtain such business. Its sales last week totaled 4000 tons, including 2000 tons to an Iowa melter and 1000 tons to a local jobbing foundry, all foundry grades for second quarter delivery. Shipments continue heavy, and the melt in the district is being well maintained. Prices are firm and unchanged.

Prices per gross ton at St. Louis:

No. 2 fdy., sil. 1.75 to 2.25, f.o.b. Granite City, Ill.	$20.00
Malleable, f.o.b. Granite City	20.50
N'th'n No. 2 fdy., deliv'd St. Louis	22.16
Southern No. 2 fdy., deliv'd	19.92
Northern malleable, deliv'd	22.16
Northern basic, deliv'd	22.16

Freight rates: 75c. (average) Granite City to St. Louis; $2.16 from Chicago; $4.42 from Birmingham.

Coke.—The demand for domestic grades of coke has fallen off considerably owing to warm weather. However, there is still a good demand for foundry and furnace grades.

Finished Iron and Steel.—March bookings of the Granite City Steel Co. exceeded the February tonnage by 32 per cent and that of January, which was a very satisfactory month, by 9 per cent. Demand for plates and blue annealed continues unabated, and the company has a very comfortable order book on both items. Galvanized sheet orders show a slight improvement. Freight car material is going out steadily, and small tank manufacturers are buying heavily of blue annealed sheets. There is a good call for strip steel from automotive and implement manufacturers, shipments for first quarter and bookings for second quarter having gained over those of last year.

Old Material.—The old material market is stronger. Some of the larger consumers have been buying heavily during the week. Very little old material is coming from any source except the railroads, whose lists are moderately large. A leading East Side consumer is said to have purchased about 10,000 tons of borings and busheling for second quarter requirements, while another mill bought a large tonnage of No. 1 heavy melting steel for consumption during the next 60 days, sales having been made at old prices. Rolling mill grades are in good demand. No. 1 heavy melting steel and miscellaneous standard-section rails are 25c. higher, while wrought iron bars and transoms; steel rails (less than 3 ft.), railroad malleable and agricultural malleable are up 50c. Railroad lists include: Pennsylvania, 45,965 tons; Santa Fe, 5695 tons; Baltimore & Ohio, 9315 tons; Rock Island, 4300 tons and 137 carloads; Wabash, 2945 tons; Pere Marquette, 1265 tons; Ann Arbor, 253 tons; Frisco Lines, 100 tons and 23 carloads; Nashville, Chattanooga & St. Louis, 13 carloads; Pullman Co., 7 carloads.

Dealers' buying prices per gross ton, f.o.b. St. Louis district:

No. 1 heavy melting or shoveling steel	$13.75 to $14.25
No. 2 heavy melting or shoveling steel	13.00 to 13.50
No. 1 locomotive tires	15.00 to 15.50
Miscel. stand.-sec. rails including frogs, switches and guards, cut apart	15.50 to 16.00
Railroad springs	17.50 to 18.00
Bundled sheets	10.00 to 10.50
No. 2 railroad wrought	13.75 to 14.25
No. 1 busheling	10.00 to 10.50
Cast iron borings and shoveling turnings	9.50 to 10.00
Iron rails	15.00 to 15.50
Rails for rolling	16.50 to 17.00
Machine shop turnings	8.50 to 9.00
Heavy turnings	10.00 to 10.50
Steel car axles	20.50 to 21.00
Iron car axles	28.00 to 28.50
Wrot. iron bars and trans.	22.00 to 22.50
No. 1 railroad wrought	14.00 to 14.50
Steel rails, less than 3 ft.	17.00 to 17.50
Steel angle bars	15.00 to 15.50
Cast iron carwheels	15.50 to 16.00
No. 1 machinery cast	16.00 to 16.50
Railroad malleable	16.00 to 16.50
No. 1 railroad cast	15.00 to 15.50
Stove plate	13.50 to 14.00
Agricult. malleable	15.00 to 15.50
Relay. rails, 60 lb. and under	20.50 to 23.50
Relay. rails, 70 lb. and over	26.50 to 29.00

Warehouse Prices, f.o.b. St. Louis

	Base per Lb.
Plates and struc. shapes	3.25c.
Bars, soft steel or iron	3.15c.
Cold-fin. rounds, shafting, screw stock	3.75c.
Black sheets (No. 24)	4.25c.
Galv. sheets (No. 24)	5.10c.
Blue ann'l'd sheets (No. 10)	3.45c.
Black corrug. sheets (No. 24)	4.30c.
Galv. corrug. sheets	5.15c.
Structural rivets	3.95c.
Boiler rivets	3.95c.
	Per Cent Off List
Tank rivets, 7/8-in. and smaller, 100 lb. or more	65
Less than 100 lb.	60
Machine bolts	60
Carriage bolts	60
Lag screws	60
Hot-press. nuts, sq., blank or tapped, 200 lb. or more	60
Less than 200 lb.	50
Hot-pressed nuts, hex., blank or tapped, 200 lb. or more	60
Less than 200 lb.	50

Youngstown

Urgency of Automobile Demand Abates Slightly

YOUNGSTOWN, April 9.—Demands of the automobile builders still are heavy, although in some quarters it is observed that pressure for shipments is not quite as urgent as it was recently. The Ford Motor Co. still presses for shipments, but some of the other builders appear to have produced all the cars they had scheduled for export, and having also pretty well supplied American dealers, are letting down in production to see whether the heavy output for domestic sale was justified. Automobile production

is not predicated wholly upon actual orders, but upon expected orders.

Steel is moving steadily and in good volume to other consuming industries. The one exception is pipe, and the revival of pipe line projects encourages the hope that there will be some improvement in total pipe business before long. Local producers are interested in the Southern Natural Gas Co. line to run from the Monroe, La., field to Birmingham, which with spur lines to Atlanta, Ga., and some other Southern cities will take more than 1000 miles and probably close to 250,000 tons. Mills are having some trouble in establishing the higher prices named for sheets for second quarter shipment, because the first quarter prices still are quoted by some producers, but in other finished products the higher second quarter prices are being observed and some business in strips is being specified at the advance.

As was indicated at the time that the Republic Iron & Steel Co. took over the Trumbull Steel Co., Warren, Ohio, the latter plant is steadily being rearranged as primarily a tin plate and strip producing unit. Sheet mills Nos. 21, 22, 23, 24 and 25 will be converted into tin plate mills. Sheet making will be continued at this plant, but two jobbing mills are to be changed into sheet mills and two new sheet mills added.

Buffalo

Pig Iron Continues Firm with Sales Small—Scrap Strong —Steel Mills Very Busy

BUFFALO, April 9.—The pig iron market continues firm, but comparatively little business is being done. All furnaces are shipping steadily against old orders. No large inquiries have come out. The new prices seem to be holding well in most cases. The lowest Buffalo price encountered by a furnace which sold 5000 to 6000 tons in the past two weeks was $18.50. Most of this tonnage was for third quarter delivery. A large Buffalo producer which uses considerable basic is practically out of the market for second and third quarter delivery of foundry iron in large lots. This company has quoted $19.50 on Eastern tonnage. Its commitments since April 1 total about 1800 tons, including 800 tons of foundry to a district melter. It is reported that a Buffalo producer contemplates shipping 150,000 tons of iron westward by water during the navigation season. Buffalo shippers are planning an active season on the barge canal. Pig iron rates will probably be advanced 25c. a ton.

Prices per gross ton, f.o.b. furnace:

No. 2 fdy., sil. 1.75 to 2.25	$18.50 to $19.50
No. 2X fdy., sil. 2.25 to 2.75	19.00 to 20.00
No. 1 fdy., sil. 2.75 to 3.25	20.00 to 21.00
Malleable, sil. up to 2.25	19.00 to 20.00
Basic	17.50 to 18.50
Lake Superior charcoal	27.28

Finished Iron and Steel.—Heavy operations characterize the Buffalo mill situation. Orders for all lines of finished material are exceptionally good. Prices are holding firm. Bars and shapes are unusually strong and active, while the demand for sheets shows no letup. Wire mesh demand is good because of the placing of road building contracts.

Warehouse Prices, f.o.b. Buffalo

	Base per Lb.
Plates and struc. shapes	3.40c.
Soft steel bars	3.30c.
Reinforcing bars	2.75c.
Cold-fin. flats, sq. and hex.	4.45c.
Rounds	3.95c.
Cold-rolled strip steel	5.85c.
Black sheets (No. 24)	4.20c.
Galv. sheets (No. 24)	4.85c.
Blue ann'l'd sheets (No. 10)	3.50c.
Com. wire nails, base per keg	$3.60
Black wire, base per 100 lb.	3.75

Old Material.—The market is somewhat stronger. Dealers are actively buying No. 1 heavy melting steel at $17.50 and have paid as high as $17.75. One sale of a sizable tonnage to a consumer was made at $17.50. Sales of No. 1 machinery cast scrap have been made at $16.75 and $17.00. There have been several sales of knuckles and couplers, coil and leaf springs and rolled steel wheels at $19.50 to $20. Malleable is in strong demand. Some dealers have not been able to make delivery on orders a month old. A quotation on chemical borings is included in this week's report, a market for this material for hardening purposes having developed here.

Prices per gross ton, f.o.b. Buffalo consumers' plants:

Basic Open-Hearth Grades	
No. 1 heavy melting steel	$17.50 to $17.75
No. 2 heavy melting steel	14.75 to 15.00
Scrap rails	17.00 to 18.00
Hydraul. comp. sheets	14.75 to 15.00
Hand bundled sheets	12.00 to 12.50
Drop forge flashings	14.00 to 14.50
No. 1 busheling	16.50 to 16.75
Hvy. steel axle turnings	14.00 to 14.50
Machine shop turnings	7.75 to 8.00
No. 1 railroad wrought	13.50 to 14.00
Acid Open-Hearth	
Knuckles and couplers	19.50 to 20.00
Coil and leaf springs	19.50 to 20.00
Rolled steel wheels	19.50 to 20.00
Low phos. billet and bloom ends	20.00 to 20.50
Electric Furnace Grades	
Short shov. steel turnings	12.00 to 12.50
Blast Furnace Grades	
Short mixed borings and turnings	11.50 to 12.50
Cast iron borings	11.50 to 12.25
No. 2 busheling	10.00 to 10.50
Rolling Mill Grades	
Steel car axles	18.75 to 19.25
Iron axles	21.00 to 22.00
Cupola Grades	
No. 1 machinery cast	16.00 to 17.00
Stove plate	14.00 to 14.50
Locomotive grate bars	13.50 to 14.00
Steel rails, 3 ft. and under	19.50 to 20.00
Cast iron carwheels	14.00 to 14.50
Malleable Grades	
Industrial	19.00 to 19.50
Railroad	19.00 to 19.50
Agricultural	19.00 to 19.50
Special Grades	
Chemical borings	14.00 to 14.50

The Chicago chapter of the Institute of Scrap Iron and Steel will hold a meeting April 11.

Detroit

Automobile Industry's Activity Continues

DETROIT, April 9.—The curve of industrial activity in the Detroit district continues the steady climb which began about the first of the year. March production figures in the automotive industry generally reached new peaks and there is no immediate prospect of a recession. Passenger car production for the first quarter of this year is almost 40 per cent ahead of that of 1928, with truck production about 65 per cent ahead.

Production of Buicks reached 15,206 in March, or 206 units ahead of the February figure.

Combined Cadillac and LaSalle production for the month was 4009 units or 10 per cent ahead of the February production. This company begins April production with a substantial volume of orders carried over from March.

March production broke all records for Chevrolet Motor Car Co., whose output of 147,274 units was considerably ahead of the figure for the previous month, which was 121,249, and also ahead of the figure for March a year ago, which was 133,657.

Production of Ford cars and trucks totaled 181,894 units in March, compared with 159,011 in the previous month. The total for the past 12 months is 1,359,353.

The Hudson Motor Car Co. shipped 44,294 units last month, which was the largest month from a production standpoint in the company's history. Total first quarter production was 108,298 cars. The April schedule has been tentatively set at 45,000.

Production at the Hupp Motor Car Corporation plant for March was 4316 units, slightly above the February figure of 4161.

The Continental Motors Corporation will start production of airplane engines this month, with sufficient unfilled orders to run this department for four months.

To Make Wider Automobile Body Sheets

Otis Steel Co., Cleveland, has started on improvements in its plant which, it states, will enable it to increase its production of full-finished sheets 1000 tons a month, making its monthly capacity 10,000 tons. Two new cold-rolling mills will be erected, and two other mills will be enlarged to make sheets 63 in. wide.

The change of the sheet mills is in response to a demand from the automobile producers for wider automobile body sheets, this increased demand being for sheets over 60 in. in width. The Otis company will build a warehouse 91 x 200 ft., and is installing a new water system to supply the open-hearth furnaces and blooming mills. The improvements call for an expenditure of $200,000.

Cincinnati

Southern Pig Iron Shows Weakness—Sheet Steel Buyers Seek Third Quarter Coverage

CINCINNATI, April 9.—Pig iron buying dropped to a low point the past week, and bookings are not expected to show substantial improvement until consumers come into the market for third quarter requirements. However, Northern furnaces are well supplied with orders and their favorable position is reflected in the firmness of prices. Southern producers, on the other hand, have accumulated considerable stocks and are reported to be making a concession of 50c. a ton to obtain current business. Despite their willingness to shade prices, they have not taken a large tonnage in the aggregate since the recent cut of $1 in their schedule. Jackson County silvery iron is moving slowly, but quotations are steady. The Globe Iron Co., Jackson, Ohio, will have its new furnace in operation on silvery iron within a few weeks, while the remodeled Norton furnace of the American Rolling Mill Co. at Ashland probably will be blown in in May. The largest sale of the week was 1000 tons of Northern foundry iron to a central Ohio melter. Inquiries include 2000 tons of Northern foundry for an Indiana user and 1500 tons for a central Ohio company.

Prices per gross ton, deliv'd Cincinnati:

So. Ohio fdy., sil. 1.75 to 2.25	$20.39 to $20.89
Ala. fdy., sil. 1.75 to 2.25	19.19
Ala. fdy., sil. 2.25 to 2.75	19.19
Tenn. fdy., sil. 1.75 to 2.25	19.19
S'th'n Ohio silvery, 8 per cent	27.89 to 28.89

Freight rates, $1.89 from Ironton and Jackson, Ohio; $3.69 from Birmingham.

Coke.—Shipments of by-product foundry coke are holding up surprisingly well this month. An important district producer states that shipping orders during April probably will equal those of March. Warm weather has brought the domestic coke market almost to a standstill. Wise County and New River beehive foundry coke is in fair demand.

Finished Material.—No signs of a falling off in demand for sheet steel have yet appeared, and all producers in this district continue to operate at full capacity. Some consumers are endeavoring to place third quarter business, but mills are accepting these tonnages only on condition that the price will be set at a later date. This policy is due to the fact that there is a strong possibility that certain grades of sheets will be increased $2 a ton for third quarter delivery. The leading district producer declares that prices are showing greater strength. This company is refusing to take orders for galvanized sheets under 3.70c., Pittsburgh. Sales of bars, shapes and plates are fairly good, and fabricators are expanding production schedules.

Old Material.—With steel plants well supplied with yard stocks and with commitments still due on current contracts, there has been no buying of consequence the past week. Meanwhile, dealers are waiting for a real test of the market and are confident that prices will gain in strength in the near future. Malleable iron and steel plant grades continue firm, but blast furnace items are weak. The Louisville & Nashville has a list of 11,000 tons, including 5543 tons of steel rails, closing this week.

Dealers' buying prices per gross ton, f.o.b. cars, Cincinnati:

Heavy melting steel	$13.50 to $14.00
Scrap rails for melting	13.75 to 14.25
Loose sheet clippings	9.75 to 10.25
Bundled sheets	10.75 to 11.25
Cast iron borings	9.00 to 9.50
Machine shop turnings	8.50 to 9.00
No. 1 busheling	10.75 to 11.25
No. 2 busheling	7.00 to 7.25
Rails for rolling	14.50 to 15.00
No. 1 locomotive tires	14.25 to 14.75
No. 2 railroad wrought	13.50 to 14.00
Short rails	18.50 to 19.00
Cast iron carwheels	12.75 to 13.25
No. 1 machinery cast	19.25 to 19.75
No. 1 railroad cast	15.25 to 15.75
Burnt cast	10.50 to 11.00
Stove plate	10.50 to 11.00
Brake shoes	10.50 to 11.00
Railroad malleable	15.50 to 16.00
Agricultural malleable	14.50 to 15.00

Warehouse Prices, f.o.b. Cincinnati

	Base per Lb.
Plates and struc. shapes	3.40c.
Bars, soft steel or iron	3.30c.
New billet reinforc. bars	3.15c.
Rail steel reinforc. bars	3.00c.
Hoops	4.05c.
Bands	3.50c.
Cold-fin. rounds and hex.	3.85c.
Squares	4.35c.
Black sheets (No. 24)	3.90c.
Galvanized sheets (No. 24)	4.75c.
Blue ann'l'd sheets (No. 10)	3.45c.
Structural rivets	3.85c.
Small rivets	65 per cent off list
No. 9 ann'l'd wire, per 100 lb.	$3.00
Com. wire nails, base per keg	2.95
Cement c't'd nails, base 100 lb. keg	2.95
Chain, per 100 lb.	7.55
	Net per 100 Ft.
Lap-weld steel boiler tubes, 2-in.	$16.00
4-in.	33.00
Seamless steel boiler tubes, 2-in.	17.00
4-in.	34.00

Steel Rates to Detroit Upheld in Proposed Report

WASHINGTON, April 9.—Passing upon a complaint by the Detroit Steel Corporation and others, Examiner Jesse C. Harraman, in a proposed report to the Interstate Commerce Commission, held that rates on iron and steel articles, in carloads, from points in Pennsylvania, West Virginia, Ohio, Indiana and Illinois are not unreasonable or otherwise unlawful. Fifth class rates apply. The complainants contended that they were entitled to have rates to Detroit from Pittsburgh and Youngstown grouped in the same manner as the rates from those centers on the same commodities to points in Indiana and Illinois. A similar grouping of commodity rates applies generally from Chicago and various points included in the Chicago producing district to points in Indiana, but not to points in Ohio and Michigan.

It was also contended by the complainants that they were entitled to commodity rates and the same groupings from the Chicago producing district to Detroit as are in effect to Indiana. Grouping of origin points from Pittsburgh, Youngstown and Chicago was asked. The railroads took the position that this traffic can well afford to pay fifth class rates, and pointed out that, since the Pittsburgh "Plus" plan was discontinued, many different methods have been adopted in invoicing iron and steel articles which take into consideration to some extent the Pittsburgh price plus the freight rates from Pittsburgh. The examiner said that any undue prejudice that may exist will be removed by the rates finally prescribed for the future by the commission in connection with its general investigation of iron and steel rates throughout Official Classification territory.

Export Rate From Pittsburgh

WASHINGTON, April 9.—In the telegraphic transmission of the report on the continuation by Eastern railroads of reduced export rates on iron and steel products, an error was made in THE IRON AGE of April 4, page 970, when it was stated that the Pittsburgh-New York export rate is 25c. per 100 lb. It should have read 20.5c.

Germany Sends One-Fifth of the Immigrants

WASHINGTON, April 8.—Of the 17,254 immigrants entering the United States in February, 10,047 or 58.2 per cent came from Europe, with Germany leading the list as usual with 3437, while 1372 came from the Scandinavian countries, 1235 from Great Britain, 1020 from Italy, 627 from the Irish Free State and 561 from Poland. During the eight months ended with February, 182,767 immigrants entered the country and 53,501 emigrants departed.

Truscon Acquires All Stock of Canadian Subsidiary

Expansion of the Trussed Concrete Steel Co., Ltd., Walkerville, Ont., with promise of the early introduction of a number of new products, is anticipated in consequence of the acquisition of all the stock of the Canadian concern by the Truscon Steel Co., Youngstown. The Youngstown company has always held a majority of Trussed Concrete Steel Co. stock. No changes in policy or in management are contemplated. Harry Mero is president and general manager of the Canadian company.

Non-Ferrous Metal Markets

Copper Price Drops, Tin at Lowest Point Since Last July, Lead Down ½c. Per Lb.; London Market Breaks

NEW YORK, April 9.

Copper.—A break in the copper price has come sooner than was expected. Influenced somewhat by a drastic decline today in London, which carried prices down £8 15s. for spot standard and £9 12s. 6d. for future standard, offers of electrolytic copper were made here today, without takers, at 22c. per lb., delivered. Large producers, being well sold up to July, are sitting tight, but custom smelters, not having sold so far ahead and not desiring to accumulate metal at the prevailing high prices, have authorized their selling agents to find a level at which sales can be made. Buyers, who a few weeks ago were scrambling for supplies and most of whom are now well covered for the next two or three months, have shown no interest, and no sales are reported at the reduced level. There was uncertainty in the market today as to the actual price that sellers might be forced to accept. Some views were expressed that custom smelters might reduce their prices to a point at which some business could be negotiated. Speculators in the metal, upon the first signs of weakness, also began offering supplies. The situation in Lake copper is also one of uncertainty; some business may be done this week, but at what price no one would venture a guess. Meanwhile, the price for that grade may nominally be quoted at about the same level as electrolytic. Just what brought about the sudden break in the London market is not thoroughly understood here, but, as there was also a sharp decline in tin and other metals, the conjecture is that the trade there lost confidence in the ability of producers to maintain what has come to be regarded as an artificial price level. London is understood to have taken the view that the discouraging of the oil conservation program by our Government was indicative of a policy which might affect copper. Copper producers see no analogy between oil and copper, considering that every effort is being made to attain maximum copper output, but that does not alter the fact that the English opinion, even though a mistaken one, may have had some influence on the copper market there.

Tin.—Tin dropped today to 46.62½c.

THE WEEK'S PRICES. CENTS PER POUND FOR EARLY DELIVERY

	Apr. 9	Apr. 8	Apr. 6	Apr. 5	Apr. 4	Apr. 3
Lake copper, New York	22.00	23.00	24.12½	24.12½	24.12½	24.12½
Electrolytic copper, N. Y.*	21.75	22.25	23.75	23.75	23.75	23.75
Straits tin, spot, N. Y.	46.62½	47.50	....	47.82½	48.00	48.37½
Zinc, East St. Louis	6.80	6.80	6.80	6.80	6.80	6.80
Zinc, New York	7.15	7.15	7.15	7.15	7.15	7.15
Lead, St. Louis	7.10	7.10	7.35	7.40	7.65	7.65
Lead, New York	7.25	7.25	7.50	7.50	7.75	7.75

*Refinery quotation; price ¼c. higher delivered in the Connecticut Valley.

Rolled Products

Mill prices on brass and copper products remain unchanged, but zinc is now quoted at 10.25c., and lead full sheets at 11.00c. to 11.25c.

List Prices, Per Lb., f.o.b. Mill

On Copper and Brass Products, Freight up to 75c. per 100 Lb. Allowed on Shipments of 500 Lb. or Over

Sheets—
- High brass ..... 27.12½c.
- Copper, hot rolled ..... 33.75c.
- Zinc ..... 10.25c.
- Lead (full sheets) ... 11.00c. to 11.25c.

Seamless Tubes—
- High brass ..... 32.00c.
- Copper ..... 35.12½c.

Rods—
- High brass ..... 24.87½c.
- Naval brass ..... 27.50c.

Wire—
- Copper ..... 25.87½c.
- High brass ..... 27.62½c.

Copper in Rolls ..... 32.75c.

Brazed Brass Tubing ..... 35.12½c.

Aluminum Products in Ton Lots

The carload freight rate is allowed to destinations east of Mississippi River and also to St. Louis on shipments to points west of that river.

- Sheets, 0 to 10 gage, 3 to 30 in. wide ..... 33.00c.
- Tubes, base ..... 42.00c.
- Machine rods ..... 34.00c.

Chicago Warehouse

(Prices Cover Trucking to Customers' Doors in City Limits)

Sheets—	Base per Lb.
High brass	27.12½c.
Copper, hot rolled	33.75c.
Copper, cold rolled, 14 oz. and heavier	36.00c.
Zinc	10.00c.
Lead, wide	11.90c.
Seamless Tubes—	
Brass	32.00c.
Copper	35.12½c.
Brass Rods	24.87½c.
Brazed Brass Tubes	35.12½c.

New York or Cleveland Warehouse

Delivered Prices, Base Per Lb.

Sheets—	
High brass	27.12½c. to 28.12½c.
Copper, hot rolled base sizes	33.75c. to 34.75c.
Copper, cold rolled, 14 oz. and heavier, base sizes	37.00c. to 38.00c.
Seamless Tubes—	
Brass	32.00c. to 33.00c.
Copper	35.12½c. to 36.12½c.
Brazed Brass Tubes	35.12½c. to 36.12½c.
Brass Rods	24.87½c. to 25.87½c.

New York Warehouse

Delivered Prices, Base Per Lb.

- *Zinc sheets (No. 9), casks* ..... 10.50c. to 11.00c.
- *Zinc sheets, open* ..... 11.50c. to 12.00c.

Metals from New York Warehouse

Delivered Prices Per Lb.

- Tin, Straits pig ..... 50.00c. to 51.00c.
- Tin, bar ..... 52.00c. to 53.00c.
- Copper, Lake ..... 25.00c.
- Copper, electrolytic ..... 24.75c.
- Copper, casting ..... 24.50c.
- Zinc, slab ..... 8.00c. to 8.50c.
- Lead, American pig ..... 8.00c. to 8.50c.
- Lead, bar ..... 10.00c. to 10.50c.
- Antimony, Asiatic ..... 11.50c. to 12.50c.
- Aluminum No. 1 ingots for remelting (guaranteed over 99% pure) ..... 25.00c. to 26.00c.
- Alum. ingots, No. 12 alloy, 24.00c. to 25.00c.
- Babbitt metal, commercial grade, 30.00c. to 40.00c.
- Solder, ½ and ½ ..... 31.75c. to 32.75c.

Metals from Cleveland Warehouse

Delivered Prices Per Lb.

- Tin, Straits pig ..... 53.00c.
- Tin, bar ..... 55.00c.
- Copper, Lake ..... 25.75c.
- Copper, electrolytic ..... 25.38c.
- Copper, casting ..... 25.25c.
- Zinc, slab ..... 8.00c.
- Lead, American pig ..... 8.25c. to 8.50c.
- Lead, bar ..... 10.50c.
- Antimony, Asiatic ..... 16.00c.
- Babbitt metal, medium grade ..... 19.50c.
- Babbitt metal, high grade ..... 57.00c.
- Solder, ½ and ½ ..... 34.00c.

Old Metals, Per Lb., New York

Buying prices represent what large dealers are paying for miscellaneous lots from smaller accumulators and selling prices are those charged customers after the metal has been properly prepared for their uses. Owing to the unsettled condition of the market these prices are nominal.

	Dealers' Buying Prices	Dealers' Selling Prices
Copper, hvy. crucible	16.50c.	18.00c.
Copper, hvy. and wire	16.00c.	17.00c.
Copper, light and bottoms	15.00c.	16.00c.
Brass, heavy	11.00c.	12.00c.
Brass, light	9.00c.	10.00c.
Hvy. machine composition	13.00c.	14.50c.
No. 1 yel. brass turnings	11.00c.	12.00c.
No. 1 red brass or compos. turnings	12.00c.	13.00c.
Lead, heavy	5.50c.	6.25c.
Lead, tea	4.75c.	5.25c.
Zinc	3.50c.	4.00c.
Sheet aluminum	13.50c.	15.50c.
Cast aluminum	12.00c.	14.00c.

per lb., the first time it has dipped below 47c. since July, 1928. Today's price is 1⅞c. below that of a week ago. The decline is largely accounted for by a sharp break which occurred yesterday and today in the London market. Spot standard there was quoted today at £208 15s., a decline of £7 6s.; future standard was £209, down £7 10s.; spot Straits was £210, a decline of £7 7s. 6d., and the Singapore price dropped £4 yesterday to £217. Trading today in the local market reached a total of 500 tons, and consumers were the chief buyers, having been attracted apparently by the low prices, whereas the opposite was the effect of the drop in copper prices. During the week the market has been in an upset condition, due, it is said, to the withdrawal of support of the market by a group in London which had heretofore not permitted the price there to drop below £220. Sales here in the past week have been at a variety of prices, ranging downward from 48.37½c. on April 3 to 46.62½c. today. A new high record for volume of trading in tin futures on the National Metal Exchange, New York, was established last Thursday, when contracts for 760 tons were made. The total surpassed that of the best previous day, Dec. 31, 1928, by 55 tons. For the first time since the exchange opened, the trading was greater than on the London Metal Exchange.

Lead.—The American Smelting & Refining Co. reduced its contract price for lead on April 8 to 7.25c., New York, a drop of ¼c. per lb., and on Thursday last reduced its price a like amount, making a total of ½c. within the week. These are the first declines this year, all previous price changes since Jan. 1 having been advances. As with other non-ferrous metals, the weakness in the London market has had an effect here. The foreign price is still below the new price of the American Smelting & Refining Co. Today's London quotation for spot lead was £24 12s. 6d., a decline of 6s. 3d., and the price for futures dropped 12s. 6d.

Zinc.—The general weakness in non-ferrous metal markets in London has had no apparent effect on zinc in the American market. Producers are comfortably sold ahead, most of them for all or nearly all of second quarter, and consumers are likewise covered on their requirements; hence day-to-day business is in small, pick-up lots, on which prices are firm at 6.80c. to 6.90c., East St. Louis. Zinc ore production in the Joplin area last week was about 15,000 tons, a gain of 600 tons over that of the previous week. Shipments were nearly 16,000 tons, so that the surplus is still small at 15,962 tons. The ore price remains at $44.

Antimony.—In a quiet market, antimony is offered at 9.50c. per lb., duty paid New York, for spot or future. This is a slight decline from last week's price.

Nickel.—Ingot and shot nickel in wholesale lots are unchanged at 35c. and 36c. respectively. Electrolytic nickel in cathodes is quoted at 35c. per lb.

Aluminum.—Quotations on aluminum continue unchanged. The published price for virgin metal, 98 to 99 per cent pure, is 23.90c. per lb., delivered.

Non-Ferrous Metals at Chicago

CHICAGO, April 9.—Prices for all non-ferrous metals are lower. Selling in this district is active, and shipments against past commitments are heavy. The old metal market is without feature.

Prices per lb., in carload lots: Lake copper, 24.35c.; tin, 48.25c.; lead, 7.45c.; zinc, 6.85c.; in less-than-carload lots: antimony, 10.62½c. On old metals we quote copper wire, crucible shapes and copper clips, 16.50c.; copper bottoms, 14.50c.; red brass, 14.12½c.; yellow brass, 11c.; lead, pipe, 6c.; zinc, 3.62½c.; pewter, No. 1, 27.62½c.; tin foil, 27.62½c.; block tin, 40.12½c.; aluminum, 12.87½c.; all being dealers' prices for less-than-carload lots.

Reinforcing Steel

Awards 5300 Tons, Mostly in Moderate-Sized Lots

REINFORCING steel awards during the week totaled 5300 tons. New projects on which bids are being submitted total about 3000 tons. None is of outstanding size. Awards follow:

BOSTON, 225 tons, Dorchester rapid transit extension, to Concrete Steel Co.

NEW YORK, 240 tons, foundations for Wall Street building, to Truscon Steel Co.

ROCKVILLE CENTER, N. Y., 250 tons, sewage disposal plant, to Truscon Steel Co.

STATE OF NEW JERSEY, 250 tons, road work; Charles Kavanagh, Bayonne, N. J., general contractor, to Truscon Steel Co.

JERSEY CITY, 275 tons, State highway viaduct, to Igoe Brothers.

WASHINGTON, 2400 tons, Department of Commerce building, to Truscon Steel Co.

CHICAGO, 270 tons, building for the Illinois Publishing Co., to Calumet Steel Co.

CHICAGO, 100 tons, planetarium, to American System of Reinforcing.

CHICAGO, 350 tons, two apartment buildings, to Inland Steel Co.

CHICAGO, 100 tons, building for Swift & Co., to Concrete Steel Co.

CHICAGO, 150 tons, warehouse for Union News Co., to Calumet Steel Co.

WENATCHEE, WASH., 150 tons, hotel, to Pacific Coast Steel Co.

TACOMA, WASH., 100 tons, City Hall, to Pacific Coast Steel Co.

SEATTLE, 185 tons, West Spokane Street bridge, to Pacific Coast Steel Co.

LONG BEACH, CAL., 130 tons, store, Broadway and Pine Street, to unnamed bidder.

LOS ANGELES, 150 tons, apartment building, 915 South Wilton Place, to unnamed bidder.

Reinforcing Bars Pending

Inquiries for reinforcing steel bars include the following:

NEW YORK, 380 tons, first section of West Side elevated highway; H. B. Greene Contracting Co., low bidder on general contract.

READING, PA., 260 tons, station for Reading Railroad; bids open April 19.

COLUMBIA, PA., 4000 tons, bridge from Columbia to Wrightsville, Pa.; bids opened.

COLUMBUS, OHIO, 750 tons, Pontifical College.

EVANSTON, ILL., tonnage not stated, building for Marshall Field & Co.

CHICAGO, 450 tons, Wilbur Wright Junior High School; O'Neil Construction Co., general contractor.

CHICAGO, 200 tons, Roberts Memorial Hospital for University of Chicago.

CHICAGO, 210 tons, apartment building at 1200 Stone Street.

CHICAGO, 100 tons, apartment building at 1242 Lake Shore Drive.

CHICAGO, 800 tons, apartment building at Fiftieth Street and East End Avenue.

CHICAGO, 500 tons, junior high school.

Railroad Equipment

Erie Buys 2500 Freight Cars and B. & O. Inquires for 3000

THE Erie Railroad swelled the already large list of freight car orders booked so far in 1929 by contracting for 2500, which were divided among five builders. The Baltimore & Ohio inquired for 3000 cars. Including miscellaneous orders, the total bought in the week was 2630. Details of the week's business follow:

Erie Railroad has ordered 2500 freight cars as follows: 1000 hopper cars from Standard Steel Car Co.; 500 box cars from General American Car Corporation; 500 automobile cars from American Car & Foundry Co.; 250 gondola cars from Greenville Steel Car Co.; 250 gondola cars from Bethlehem Steel Co.

Baltimore & Ohio has entered market for 2000 70-ton hopper cars and 1000 70-ton low-side gondola cars.

New York Central has ordered 40 passenger-train cars as follows: 20 baggage cars from American Car & Foundry Co.; 10 dining cars from Pullman Car & Mfg. Corporation; 10 passenger-baggage from Pressed Steel Car Co. Two thousand freight cars which the New York Central is expected to order will, it is reported, be built by Merchants' Despatch, Inc.

Pennsylvania will build 1000 steel box car bodies in its Altoona, Pa., shops.

Southern Pacific has ordered 20 air dump cars from Magor Car Corporation, and is inquiring for 15 74-ft. chair cars.

Timken Roller Bearing Co. has ordered 10 steel gondola cars from American Car & Foundry Co.

Anglo-Chilean Consolidated Nitrate Corporaation has ordered 100 30-ton gondola cars from Magor Car Corporation.

Central Railroad of New Jersey has ordered five eight-wheel switching locomotives from Baldwin Locomotive Works.

Chicago & North Western has ordered five passenger-baggage cars from Pullman Car & Mfg. Corporation.

Delaware & Hudson will buy one consolidation type locomotive designed for 500-lb. steam pressure.

Denver & Rio Grande Western will buy four Mountain type locomotives similar to 10 recently ordered from Baldwin Locomotive Works.

Fabricated Structural Steel

Awards Again Large at 74,000 Tons, Including 22,000 Tons for River Barges—Inquiries for 27,000 Tons

FORTY steel barges for the Inland Waterways Corporation, taking 22,000 tons of steel, top the list of structural steel awards of the week and swell the total to nearly 74,000 tons, which includes some jobs in Canada, among which the Canadian Bank of Commerce Building in Toronto, calling for 12,000 tons, is the largest. Contemplated work, on which bids are being taken, totals about 27,000 tons, the largest item being 5700 tons of catenary bridges for electrification of the Pennsylvania Railroad from Trenton to Philadelphia. Awards follow:

PROVIDENCE, R. I., 520 tons, Nurses' Home and hospital addition, to McClintic-Marshall Co., previously reported to Providence Steel & Iron Co.

PROVIDENCE, 100 tons, city hospital addition, to Providence Steel & Iron Co.

BOSTON & MAINE RAILROAD, 315 tons, three bridges, to Boston Bridge Works, Inc.

SPRINGFIELD, MASS., 480 tons, *Republican* plant, to Haarmann Steel Co.

GREENFIELD, MASS., 114 tons, bank, to Palmer Steel Co.

BRIDGEPORT, CONN., 100 tons, plant addition, to American Bridge Co.

NEW YORK, 3400 tons, store at 625 Madison Avenue, to McClintic-Marshall Co.

NEW YORK, 3000 tons, Beaux Arts apartments, East Forty-fourth Street, to McClintic-Marshall Co.

NEW YORK, 4000 tons, warehouse on Varick Street, to McClintic-Marshall Co.

NEW YORK STATE, 325 tons, two highway bridges, to Bethlehem Steel Co.

PENNSYLVANIA RAILROAD, 500 tons, trolley poles, to Shoemaker Bridge Co.

BRISTOL, PA., 150 tons, building for Airport Development Co., to Belmont Iron Works.

DEAL LAKE, N. J., 200 tons, bridge, to American Bridge Co.

PHILADELPHIA 2550 tons, plate girder bridge for Reading Railroad, to McClintic-Marshall Co.

CARNEY'S POINT, PA., 260 tons, cotton drying building for Du Pont Engineering Co., to Belmont Iron Works.

BALTIMORE, 3000 tons, plant for Western Electric Co., to McClintic-Marshall Co.

WASHINGTON, 22,000 tons, 40 steel barges for Inland Waterways Corporation, awarded as follows: 24 to American Bridge Co., 11 to Riter-Conley Co., and five to Midland Barge Co.

LOUISVILLE, 500 tons, tobacco factory for Brown-Williamson Co., to Louisville Bridge & Iron Co.

PITTSBURGH, 5600 tons, five bridges for Pittsburgh & West Virginia Railway; four bridges, 3600 tons, to American Bridge Co., one bridge, 2000 tons, to McClintic-Marshall Co.

PITTSBURGH, 4200 tons, power station for Duquesne Light Co., to American Bridge Co.

JOHNSTOWN, PA., 1400 tons, Jaffa Temple, to Brown Fayro Co., Johnstown.

BUFFALO, 855 tons, apartment building, to Pittsburgh Bridge & Iron Co.

TORONTO, 1000 tons, automotive building for Canadian National Railways, to Reid & Brown Structural Steel & Iron Works.

TORONTO, 12,000 tons, Canadian Bank of Commerce Building, to Hamilton Bridge Works.

MONTREAL, 2000 tons, office building for Sun Life Assurance Co. of Canada, to Dominion Bridge Co.

DETROIT, 900 tons, Detroit Edison power house, to McClintic-Marshall Co.

DETROIT, 230 tons, conveyor system for Detroit Edison Co., to Russell Steel Co.

BAY CITY, MICH., 180 tons, plant extension for Bay City Dredge Co., to Wisconsin Bridge & Iron Co.

EVANSTON, ILL., 850 tons, building for Marshall Field & Co., to Midland Structural Steel Co., Chicago.

CHICAGO, 750 tons, open-hearth building for Inland Steel Co., to McClintic-Marshall Co.

CHICAGO, 100 tons, garage at Grand Avenue and Seneca Street, to McClintic-Marshall Co.

CHICAGO, 100 tons, Cyrus H. McCormick residence, to Wendnagel & Co.

CHICAGO, 130 tons, North Shore Airport, to Wendnagel & Co.

SAN FRANCISCO, 300 tons, bridge work for Southern Pacific Co., to Virginia Bridge & Iron Co.

SAN DIEGO, CAL., 250 tons, bank, to National Iron Works.

SANTA MONICA, CAL., 150 tons, office building, Third Street and Santa Monica Boulevard, to McClintic-Marshall Co.

SAN PEDRO, CAL., 100 tons, warehouse at berth 217, to Consolidated Steel Corporation.

GLENDALE, CAL., 100 tons, hangar for Transcontinental Air Transport, Inc., to Pacific Iron & Steel Co.

LOS ANGELES, 1500 tons, theater, Hollywood Boulevard and Argyle Street, to McClintic-Marshall Co.

LOS ANGELES, 250 tons, warehouse addition, United States Steel Products Co., to Consolidated Steel Corporation.

Structural Projects Pending

Inquiries for fabricated steel work include the following:

BOSTON, 600 tons, medical building for City Hospital.

BOSTON, 200 tons, West Roxbury district church.

NEW YORK, 2000 tons, office building on West Forty-first Street.

NEW YORK, 400 tons, changes at Pennsylvania Railroad Terminal.

NEW YORK, 600 tons, addition to Sheffield Farms building in Bronx.

NEW YORK, 22,500 tons, West Side roadway from Canal Street to Twenty-Second Street; H. B. Greene Contracting Co., New York, low bidder for general contract.

NEW YORK STATE, 200 tons for highway bridge.

NEW YORK CENTRAL RAILROAD, 370 tons, bridge at Lackawanna, N. Y.; new bids asked.

PHILADELPHIA, 5700 tons, catenary bridges for Pennsylvania Railroad electrification from Trenton to Philadelphia.

COLUMBIA, PA., 350 tons, bridge from Columbia to Wrightsville, Pa.; bids opened.

SOUTH GREENSBURG, PA., 300 tons, bridge; Fort Pitt Bridge Works, low bidder.

GRAND RAPIDS, MICH., 1500 tons, school.

CHICAGO, 1400 tons, two public schools.

CHICAGO, 800 tons, planetarium; B & W Construction Co., general contractor.

CHICAGO, 400 tons, building for City Bank & Trust Co.

CHICAGO, 5000 tons, contemplated addition to Mercantile Mart.

INDIANA HARBOR, IND., 750 tons, power house for Inland Steel Co.

INDIANA HARBOR, 200 tons, office building for Inland Steel Co.

EL RENO, OKLA., 400 tons, building for Chicago, Rock Island & Pacific.

PONCA CITY, OKLA., 1000 tons, power house.

LOS ANGELES, 2000 tons, Federal Reserve Building; bids being received.

LOS ANGELES, 2000 tons, May Department Store; bids being received.

LOS ANGELES, 500 tons, hospital, Hill Street and Sunset Boulevard; bids opened.

SAN FRANCISCO, 182 tons, apartment building, Pacific and Laguna Streets; Schrader Iron Works, low bidder.

OAKLAND, 444 tons, warehouse for Port Commission; Pacific Coast Engineering Co., low bidder.

New Coatings to Protect Steel from Rust

For protecting sheet and strip steel from rusting, a new material has been put upon the market. It is stated to be particularly suitable to take the place of slushing oils which it is customary to spread upon sheet or strip steel when shipped from the maker's plant to the user. Such oil, however, after it has served its purpose, must be removed, it is said, by rather expensive washing machines or by costly hand methods.

The new material is offered under two names—"Paralan" and "Rustop"—and is manufactured by the American Lanolin Corporation, Lawrence, Mass. Not much information is given concerning the composition of these coatings, but it is stated that they contain organic salts of chromium and not mineral salts. The manufacturer states that, by combining these chromium salts with a coating which, when dry, is claimed to be more nearly impervious than any other, an ideal material for excluding air and moisture, and at the same time retarding electrolytic action, is produced.

The two products differ in their application and usage, but yield the same general results. Paralan, it is stated, was developed to prevent rust from attacking the finished product of one of the large cold-rolled strip plants. Rustop, it is asserted, was provided to take the place of heavy slushing oils and greases commonly used to protect bright steel parts from rusting. It differs from Paralan in that it dries quickly and leaves a bright film. The idea behind Rustop is to provide a protective film that will prevent oxidation and corrosion for a long period.

In using these products, it is stated, there is no sticky or greasy material to cope with. The coatings can be easily removed by hot water and other simple expedients, and the steel sheets or strip are then in such a condition that they can be easily painted or enameled. In some cases, it is added, they can be painted or enameled without removing the coating.

Many Firms Disappear Through Mergers

Consolidations Extinguish 1100 Concerns in Iron and Steel Industry During Last Ten Years

WASHINGTON, April 9.—Leading all others, the iron and steel industry experienced about one-fifth of all the mergers in the mining and manufacturing industries since 1919, according to Prof. Willard L. Thorp, of Amherst College, in a report on the changing structure of industry to the President's Unemployment Conference. The totals are given in the adjoining table.

Professor Thorp studied changes in the control of concerns in the fields of mining and manufacturing. He noted that there were an important number of mergers also of department stores and hotels. Banks, too, it was observed, underwent a steady increase in consolidations, numbering 80 in 1919 and 259 in 1927. Many of the mergers not included in the studies were of subsidiaries, while still others involved foreign concerns.

"The consolidation," said Professor Thorp, "appears to be most active in periods of prosperity and to show a marked decline during depression." Some of the consolidations seem to have been motivated by the motto, "In union there is strength." On the other hand, "many of the mergers represent a realinement of industry which should result in cheaper and more efficient production. . . . Various indicators point to the fact that mergers today are dominated as a rule much less by the desire for economies in production than by the search for better markets and market conditions. It has been suggested that our national economy is directed to a 'buyers' markets' rather than 'sellers' markets.' No longer is the producer striving to turn out the goods demanded; he is rather struggling to distribute the goods which his improved and increased capacity can produce.

"This opinion is well expressed in the combined opinion of 149 editors of business papers in the latest semi-annual survey conducted by business paper editors.

"While in former years mergers were chiefly for refinancing purposes, it was found that those effected in 1928 and contemplated for the present year have been undertaken rather as a means to find the way out of ruinous competition and to facilitate necessary research developments, both as to products and markets. . . . And so manufacturers are gaining control of outlets, and the outlets, in the case of chain stores, for example, are often forcing mass production to facilitate mass distribution. The problem is new, and the success of the merger as a method of meeting it can not yet be told."

Professor Thorp pointed out that there has been one development of which little information can be secured, namely, the effort to reach back to the source of raw materials and to carry these through the various processes up to the finished product.

Number of Consolidations in Iron and Steel

	1919	1928	Total, 1919 to 1928
Mergers recorded	24	35	270
Number of concerns merged	56	87	970
Number of concerns acquired	50	85	674
Number of concerns disappearing	82	137	1,094

Number of Consolidations in Manufacturing and Mining

(United States Bureau of Census Classification)

	Total, 1919 to 1928
Mergers recorded	1,268
Number of concerns merged	4,135
Number of concerns acquired	3,124
Number of concerns disappearing	5,991

Giddings & Lewis Machine Tool Co. Reorganizes

Retirement of Fred J. Rueping as president and chairman of the board of the Giddings & Lewis Machine Tool Co., Fond du Lac, Wis., and the acquisition of his interest by H. B. Kraut, vice-president and general manager, and by associated executives, were announced April 1, in connection with a public offering of stock under a reorganization and refinancing plan. The new authorized capitalization consists of 6000 shares of 6 per cent cumulative preferred stock of $50 par value and 8000 shares of common stock, 7000 of which are being offered at $50 each.

The Giddings & Lewis company manufactures a complete line of table, floor and planer type horizontal boring, drilling and milling machines. It was established at Fond du Lac in 1859, and is credited with having operated the first foundry in Wisconsin. For more than 45 years it manufactured sawmill machinery. In 1905 production of metal-working tools was inaugurated, and in 1910, when Mr. Rueping acquired controlling interest, the company discontinued manufacture of sawmill machinery and began to concentrate on machine tools. Development of the boring machine line early in 1914 was followed by production of an internal grinder, the latter line being sold in 1927 to the Heald Machine Co., Worcester, Mass., in order that the Fond du Lac company might devote itself exclusively to the manufacture of boring machines. Sales in 1928 totaled more than $700,000 and business of $1,000,000 or more is looked for this year. Average annual net earnings for 1927-1928 were in excess of $83,000.

Boston Societies Visit Fore River Shipyard

Under the guidance of Edward B. Ashworth, superintendent of heat treating and drop forge departments, about 250 members of the Boston chapters, American Society for Steel Treating and the American Welding Society, inspected the Fore River plant, Bethlehem Shipbuilding Corporation, Quincy, Mass., on April 5.

Welding demonstrations, motion pictures, and a visit to the cruiser Northampton, now on the ways, occupied the afternoon. After-dinner talks were made by H. E. Gould, general manager of the Fore River plant, and by J. R. Dawson, metallurgical engineer, Union Carbide & Carbon Research Laboratories, Inc., Long Island City, N. Y.

Sharp Gains in Sales of Brass Pipe

Sales of brass pipe reached the unprecedented total of 76,777,400 lb. in 1928, or almost five times the amount sold in 1922, according to statistics compiled by the Copper & Brass Research Association. The total for 1928 was approximately 14,000,000 lb. above the total for 1927, this being one of the largest gains in a single year since consumption of brass pipe (IPS) assumed large proportions.

In 1922 sales were 16,016,500 lb., so that the total for 1928 represents a progressive increase to an additional 61,000,000 lb. in yearly consumption. On a percentage basis the gains over 1922 were 5 per cent in 1923, 61 per cent in 1924, 145 per cent in 1925, 234 per cent in 1926, 293 per cent in 1927, and 379 per cent in 1928, or an average gain of 74.8 per cent annually since 1923.

Steel Ingot Production, by States, in 1927

(In Gross Tons)

Alabama and Georgia (a)	1,580,970
California, Colorado, Utah, Washington and Texas	1,167,578
Connecticut, Massachusetts and Rhode Island	249,353
Delaware, Maryland and New Jersey	1,384,368
Illinois	3,495,327
Indiana	5,456,873
Kentucky, Virginia and West Virginia	1,544,899
Michigan, Minnesota and Missouri	663,885
New York	1,894,879
Ohio	10,708,184
Pennsylvania	15,627,447
Total	43,773,763

(a) In some cases figures for individual States cannot be given without disclosing the production of individual establishments. The figures are from the Census of Manufactures.

PERSONAL

R. S. POISTER, who, as noted in THE IRON AGE of last week, resigned as metallurgical engineer in charge of the Pittsburgh office, Electro Metallurgical Sales Corporation, as of April 15, will become general superintendent of the Alan Wood Steel Co., Ivy Rock, Pa. For a brief period prior to joining the Electro Metallurgical Corporation a little more than three years ago, Mr. Poister served as open-hearth furnace superintendent at the same plant to which he is to return. Previously, for 10 years, he had been identified with the United Alloy Steel Corporation, Canton, Ohio, as superintendent of electric furnaces and Plant A open-hearth furnaces. He received his advanced education at Case School of Applied Science, Cleveland, and was with the Cleveland Furnace Co., Cleveland, before going with the United corporation. Mr. Poister is a member of the American Foundrymen's Association, the American Institute of Mining and Metallurgical Engineers, American Society for Steel Treating, the American Iron and Steel Institute, and the Iron and Steel Institute of Great Britain.

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JOHN C. PANGBORN, vice-president, Pangborn Corporation, Hagerstown, Md., sailed on the Olympic, April 5, for an extended tour of the Continent.

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E. C. ANDERSON, formerly connected with the Stocker-Rumely-Wachs Co., Chicago, has joined the Chicago sales force of the Modern Tool Division, Consolidated Machine Tool Corporation of America, Rochester, N. Y.

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A. B. JONAS, formerly of the New York office of the Crosby Co., Buffalo, maker of sheet-metal stampings, has been placed in charge of the Philadelphia district with an office at 121 North Broad Street, Philadelphia.

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E. P. BOYER, who for 10 years has been associated with the Alexander Milburn Co., Baltimore, and subsidiary companies, has been elected vice-president. His first connection with the company was as Philadelphia district sales manager. In 1926 he established the Milburn Sales Co., taking charge of the Philadelphia territory and later the New York and Chicago territories, and in 1928 he was elected vice-president of the Milburn Sales Corporation and the Milburn Paint Spray Corporation, distributers of the products of the Alexander Milburn Co.

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L. M. LINDSEY has joined the sales force of Holcroft & Co., Detroit. He was formerly connected with the Celite Products Co.

JAMES H. WHITTAKER, who for many years was connected with the Brown & Sharpe Mfg. Co., Pratt & Whitney Co., and the Davenport Machine Tool Co., has been made general superintendent of the Cincinnati Planer Co., Cincinnati.

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ARTHUR L. MEYER has been appointed assistant general manager of sales of the Alan Wood Steel Co., Conshohocken, Pa. Mr. Meyer was formerly with the sales department of the Illinois Steel Co., Chicago. Previous to that time, he was connected with the operating department as metallurgical engineer.

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HOWARD H. TALBOT, since 1923 associated with the United Engineering & Foundry Co., Pittsburgh, has been appointed chief engineer of that company, succeeding the late Lane Johnson. Mr. Talbot attended Beloit College, Beloit, Wis., and the Case School of Applied Science, Cleveland. He gained his early experience with the Connecticut Co., New Haven, Conn., a public utility subsidiary of the New York, New Haven & Hartford Railroad, and later served as engineer for the William Tod Co., Youngstown. Before going with the Engineering & Foundry company, he was chief engineer for the Woodard Machine Co. department at Wooster, Ohio, of the Macintosh-Hemphill Co., Pittsburgh.

H. H. TALBOT

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R. Z. ZIMMERMANN has been elected vice-president in charge of purchasing for the United Gas Improvement Co., Philadelphia, succeeding J. A. PEARSON, who retired recently after 40 years of service with the company. Mr. Zimmermann has been associated with Day & Zimmermann, Inc., an affiliated company, since 1916.

JAMES A. CAMPBELL, president, Youngstown Sheet & Tube Co., back in Youngstown after a sojourn in the South, is cheerful about the business prospects for the year. He does not expect the summer recession this year will be any greater than it was last year, when production declined only about 15 per cent from the April peak.

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EDWARD E. MARBAKER, director foundry research division, Whiting Corporation, Harvey, Ill., will speak on "Operation of the Foundry Cu- ' at the regular monthly meeting of the Pittsburgh Foundrymen's Association at the Fort Pitt Hotel, Pittsburgh, Monday evening, April 15.

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STANLEY DELONG has been named president of the reorganized Pierce, Butler & Pierce Mfg. Corporation, New York, succeeding ROGER MORTON. He became identified as manager with the Syracuse plant of the company about a year ago. HURLBURT W. SMITH was made vice-president and IRVING N. BEELER continues as chairman of the board of directors.

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JOSEPH G. WORKER, director of American Engineering Co., Philadelphia, has been elected vice-president of the Electric Hoist Manufacturers' Association.

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H. M. SCHAAB has been appointed manager of steel door sales for the Truscon Steel Co., Youngstown. He heads a department handling units varying from pier and airplane hangar doors to standard type doors and will have offices in 60 cities.

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C. S. ROBERTS, formerly assistant engineer of structural sales in the Chicago office of the Bethlehem Steel Co., has been appointed sales engineer of sheet piling for the Western district. His headquarters will remain at Chicago.

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HENRY A. BARREN has resigned as vice-president in charge of operations of the American Steel & Wire Co. He became vice-president in January, 1928, previous to which he had been general superintendent. His first employment was with the old Cleveland Rolling Mill Co. at Newburgh, Ohio, when he was 15 years old. Entering Ohio State University in 1882 he spent three years on a special course in engineering and drafting, returning to the rolling mill as a draftsman. In 1891, he became master mechanic of the plant, retaining that position when it became the Newburgh Steel Works of the American Steel & Wire Co. He was made superintendent of the plant in 1901, retaining that position until Jan. 1, 1912, when he was appointed general superintendent of the company's steel works and blast furnaces in the Cleveland and Pittsburgh districts. He held this position until he became general superintendent for the company in 1924.

Foundry Convention Opens in Chicago

Attendance at End of Second Day was 2300—Exhibition in Hotel With Meetings Attracts Many Visitors

CHICAGO, April 9.—Foundrymen from many parts of the United States and Canada are here this week attending the convention of the American Foundrymen's Association at the Stevens Hotel. Fifty technical papers and reports are scheduled for delivery at 20 sessions. There will also be five special round table luncheon discussions.

The attendance is very large, registration at the close of the second day having been over 2300.

An exhibition unique in its size and character and held in the same hotel as the meetings is attracting large crowds to see what the 150 or more exhibitors have to display. A good business is reported.

At the annual meeting yesterday afternoon, it was announced that the next annual convention and exhibition will be in Cleveland in the enlarged auditorium the week of May 12, 1930.

New officers were declared elected as follows: President, Fred Erb, president, Erb-Joyce Foundry Co., Detroit; vice-president, N. K. B. Patch, secretary, Lumen Bearing Co., Buffalo; directors for three years: H. K. Falk, vice-president and works manager, Falk Corporation, Milwaukee; F. J. Lanahan, president, Fort Pitt Malleable Iron Co., Pittsburgh; Arnold Lenz, manager, Chevrolet Motor Co., Saginaw, Mich.; Delos H. Wray, vice-president, Henry Wray & Sons, Inc., Rochester, N. Y., and S. T. Johnson, vice-president, S. Obermayer Co., Chicago.

Dr. Siegfried Werner, president, German Foundrymen's Association, Düsseldorf, Germany, addressed the annual meeting yesterday, calling particular attention to the International Foundrymen's Congress in London in June, this year, and announcing that the fourth congress will be held in Düsseldorf in 1932.

J. H. Whiting, chairman of the board, Whiting Corporation, Harvey, Ill., was made an honorary member.

H. Blair, apprentice molder, Brown & Sharpe Mfg. Co., Providence, R. I., has been awarded the S. Obermayer prize for 1929.

At the session on cast iron metallurgy this morning, an excellent paper was presented on the effect of blast furnace practice on quality of pig iron and cast iron by A. L. Boegehold, General Motors Corporation, Detroit. It developed valuable discussion and keen interest.

Cleveland Census Taken on Industrial Products

WASHINGTON, April 6.—Establishments in Cleveland and environs, each with an annual output of $100,000 or more, purchased raw materials, semi-finished products, mill supplies, maintenance material and equipment from manufacturers of iron and steel products, not including machinery, to the amount of $158,907,292 in 1927. Sales of the finished products of these same concerns during the year were valued at $275,918,513.

The foregoing figures are presented in a preliminary report on a census of industrial purchases and sales conducted by the Department of Commerce with the assistance of the Cleveland Chamber of Commerce. This was a trial census to determine the practicability of including the industrial phase of distribution in the national census of distribution for 1930, provided it is authorized by Congress, and to determine what data on the inter-industry phase of distribution should be sought.

Purchases in the raw material group included iron ore valued at $11,884,628 and miscellaneous raw materials amounting to $38,132. The cost of semi-finished products were divided as follows: steel, $59,395,025; pig iron, $20,512,397; scrap iron and steel, $12,384,556; non-ferrous metals, $4,393,696; wire, $3,525,529; castings, $3,230,941; plumbing supplies, $1,429,060; tin, $1,404,398; ferroalloys, $1,289,168, and numerous other items, including bolts, nuts, rivets, screws, electrical supplies, builders' hardware, etc. The total purchases of mill supplies, fuel, packing material, etc., were valued at $21,999,606, the items of limestone and dolomite having been valued at $1,126,856. The cost for equipment, maintenance, etc., was recorded as $10,931,452. Of this total, $4,006,839 was charged to repairs and additions to buildings and repairs to equipment; $2,289,340 for factory equipment and $925,044 for new machinery.

Clark Brothers Co. 75 Years Old

Clark Brothers Bolt Co., Milldale, Conn., manufacturer of bolts, nuts, screws and kindred products, is celebrating the seventy-fifth anniversary of the founding of the company. A history prepared by the company states that the bolt and nut industry was first established in the United States at Marion, Conn., in 1837. The Clark business was begun in 1854, but as early as 1851 William J. Clark was engaged in the business in a small way, and it was from this beginning that the present corporation, formerly a partnership, sprung.

The company today manufactures nearly all types of bolts and nuts, including special shapes, also rivets and screws. The plant is equipped with the latest automatic machines. Many of the employees of the company have been engaged for periods ranging from 25 to 60 years, and one customer has been steadily on the books for 66 years. The present officers of the company are: Edwin S. Todd, president; Oscar G. Knapp, secretary-treasurer; Walter D. Wallace, assistant secretary and treasurer; Boughton T. Noble, superintendent.

Large Increase in Electric Industrial Trucks

Shipments of electric industrial trucks and tractors totaled 210 units in March, according to reports to the Department of Commerce by the 11 leading manufacturers. This is the largest total since these figures were first compiled, beginning in 1925. It compares with 134 units in February and 152 in January. In March of last year the total was 129. For the first quarter the total has been 496, compared with 360 last year, showing a gain of 38 per cent.

Of the March shipments 14 were tractors and 186 were other types for domestic use, while 10 were sent abroad. It is in the "other types" that the high record has been made, as the number of domestic tractors and the number of units exported have been exceeded by several monthly totals in the past.

Obituary

WILLIAM HENRY BROWN, one of the founders and for many years president of the old Brown-Ketcham Iron Works in Indianapolis, died recently at his home, aged 88 years.

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C. E. CARPENTER, president and general manager, E. F. Houghton & Co., Philadelphia, died of heart disease in Miami Beach, April 7, aged 67 years. He was noted as a public speaker and was active in politics.

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RALPH B. KILMER, vice-president in charge of sales of the Pfaudler Co., Rochester, died of pneumonia on April 5 at his home, aged 40 years. He had been with the company a number of years in its Chicago office.

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GEORGE HALE BARRUS, prominent in the field of mechanical engineering, died at his home in Brookline, Mass., last week. He was born in Goshen, Mass., July 11, 1854, and received his preparatory education in the Reading, Mass., public schools. Later he was graduated at the Massachusetts Institute of Technology. Mr. Barrus was the author of a number of professional books and contributed many technical papers to trade journals.

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ARCHER H. BROWN, oldest son of the late Archer Brown, who was a member of Rogers, Brown & Co., died at his home in Greenwich, Conn., on April 7, aged 47 years.

Machinery Markets and News of the Works

Slight Tapering in Demand

First Week of April Brings Signs of Easing in Situation, Though Orders Are Still Heavy

MACHINE tool orders, though still heavy, were in slightly reduced volume in the first week of April, compared with recent weeks. In some markets also a falling off in inquiries is noticeable. As deliveries are now running into midsummer or late summer, this situation may be partly explained on that ground, although another factor is that many of the automobile companies have completed their major purchasing, at least until fall.

The Chicago market is conspicuously active, the miscellaneous requirements of varied industrial lines maintaining a volume of orders in keeping with recent records. Farm implement manufacturers continue as important buyers. The needs of several railroads, while small individually, are more prominent than recently. The St. Paul road has ordered several engine lathes. Other carriers are expected to buy miscellaneous lots of tools within the next few weeks.

Despite a falling off in buying in the Detroit district, automobile companies are still contributing an important share of the total machine tool orders. Parts manufacturers are active buyers at Cleveland.

Small electric motors have been advanced in price 12½ to 15 per cent, effective at once. A manufacturer of shapers has advanced prices about 15 per cent.

Owing to the delivery situation on new tools, the demand for good used tools is more urgent in some districts.

New York

NEW YORK, April 9.—Machine tool orders in the first week of April have continued in undiminished volume. Inquiries are numerous, and sellers are generally optimistic that there will be no pronounced falling off in business this month, if indeed there is any falling off at all. The money market and stock market situations have had as yet no appreciable effect either on actual purchases or on the attitude of manufacturers concerning machine tool requirements. Collections are strikingly good, a condition almost without precedent in periods of disturbance in the money market.

American Cyanamid Co., 535 Fifth Avenue, New York, will increase capital from 1,000,000 to 1,600,000 shares of stock, majority of proceeds to be used for expansion in fertilizer plant at Warners, N. J., and for development of phosphate properties recently secured in Florida.

Wilson-Brown, Inc., machine tool dealer, representing R. K. Le Blond Machine Tool Co., Carlton Machine Tool Co., Cincinnati Shaper Co., Universal Boring Machine Co. and W. F. & John Barnes, has moved its offices from 2 Rector Street to room 702 at 30 Church Street, New York.

General Electric Co., 120 Broadway, New York, and Schenectady, has leased building at 416-24 West Thirteenth Street, totaling 145,000 sq. ft. floor space, for establishment of central service and equipment repair works. Present department on Greenwich Street will be removed there.

Cannava & Viviani, 690 Eighth Avenue, New York, architects, have filed plans for five-story automobile service, repair and garage building, 40 x 105 ft., to cost about $100,000 with equipment.

Indian Refining Co., 17 State Street, New York, has arranged for additional stock issue totaling about $2,461,470, part of proceeds to be used for expansion in refinery at Lawrenceville, Ill., for development of new process for production of lubricating oils.

Yonkers Plumbing & Supply Co., 43 Dock Street, Yonkers, N. Y., has awarded general contract to D. Tuccillo, 110 East Fifth Street, Mount Vernon, N. Y., for one-story storage and distributing plant, with pipe-cutting and fitting shop, to cost about $50,000 with equipment. George W. Kibitz, 410 East Tremont Avenue, New York, is architect.

Kohn & Mundus, Inc., 1 Park Avenue, New York, manufacturer of furniture, has acquired factory at Long Island City, totaling about 185,000 sq. ft. floor space, heretofore occupied by Brunswick-Balke-Collender Co., and will occupy for new plant. Brunswick company has leased part of plant of National Container Corporation, aggregating 50,000 sq. ft. floor space, for factory branch and distributing plant.

Anaconda Wire & Cable Co., a subsidiary of Anaconda Copper Mining Co., 25 Broadway, New York, has purchased plant and business of Tubular Woven Fabric Co., Pawtucket, R. I., which will be consolidated with organization. Arrangements have also been completed for acquisition of Maring Wire Co., Muskegon, Mich., with branch mill at Anderson, Ind.

F. A. Ottmann & Son, Inc., Mamaroneck, N. Y., sand, gravel and crushed stone, is establishing new storage and distributing plant at East Port Chester, N. Y., where tract of 35,000 sq. ft. has been secured. Caterpillar cranes, truck loaders, conveying apparatus, storage bins, etc., will be installed.

Hercules Corrugated Box Corporation, Borden Avenue, Long Island City, has leased space in building No. 8, Bush Terminal, South Brooklyn, totaling 50,000 sq. ft. floor space, and will occupy for new plant.

Stettner Phonograph Corporation, 322 East Seventy-fifth Street, New York, manufacturer of phonograph and radio cabinets, etc., has purchased two-story factory at Brooklyn, for new plant and will remove to new location.

Serel Co., Inc., Third and Grand Streets, Hoboken, N. J., manufacturer of electric stoves, etc., has leased space in building on Communipaw Avenue, Jersey City, N. J., for new plant.

Sheet Metal & Roof Craftsman, Inc., Avon, N. J., care of Warren H. Conover, 114 Liberty Street, New York, architect, has awarded general contract to J. R. Miller & Sons, Spring Lake, N. J., for two-story plant to cost about $45,000 with equipment.

Sirian Wire & Contact Co., 253 Sherman Avenue, Newark, manufacturer of wire for lamps and radio tubes, etc., subsidiary of Sirian Lamp Co., same address, has purchased property at Sherman Avenue and Clifton Street, 200 x 225 ft., consisting of two three-story buildings, and one-story structure, and will occupy for new plant for increased production. Both companies are affiliated with Arcturus Radio Co., same address, which recently secured a factory on Frelinghuysen Avenue for expansion.

Fireproof Products Co., 536 East 133d Street, New York, fireproof building products, metal lath, etc., has leased property at 279-95 Badger Avenue, Newark, totaling 6000 sq. ft. of floor space, for new factory branch and distributing plant.

White Co., 842 East Seventy-ninth Street, Cleveland, manufacturer of motor trucks and buses, has purchased property, 183 x 400 ft., at Newark, as site for new factory branch, service and repair building, to cost more than $100,000 with equipment. Structures now on plot will be razed.

Keller Mechanical Engineering Corporation, Brooklyn, N. Y., maker of dies and mold cutting machines has arranged its own sales organization for territories

formerly served by W. E. Shipley Machinery Co., Henry Prentiss & Co., and Marshall & Huschart Machinery Co. Arthur Jenner, with headquarters in Philadelphia, will handle eastern Pennsylvania, New Jersey, Maryland, Delaware and the metropolitan district of New York; W. L. MacRae, Syracuse, will have the rest of New York State; P. C. Renno, Chicago, will take care of that territory, including northern Indiana, western Michigan, Illinois and Wisconsin.

American Engineering Co., stoker division, New York, will move about April 20 to the American Radiator Building 40 West Fortieth Street.

Buffalo

BUFFALO, April 8.—Borst Engineering Co., Buffalo, care of Andrew J. Borst, Jr., 91 Elmer Avenue, president, recently organized by Mr. Borst and associates, with capital of $150,000, to manufacture shackles and other automobile equipment, is arranging for establishment of local plant, to cost more than $65,000 with machinery. Branch plant is planned at Hamilton, Ont. Wilbur F. Groom, Groom Motor Corporation, 3126-34 Bailey Avenue, is treasurer.

Crane Co., 836 South Michigan Avenue, Chicago, has plans for one-story factory branch and distributing plant at Utica, N. Y., with pipe-cutting, fitting and other mechanical departments, to cost about $75,000 with equipment. Edward Rowe, 730 West Genesee Street, Syracuse, N. Y., is district manager.

Harrison Radiator Co., Lockport, N. Y., manufacturer of automobile radiators, has filed plans for three-story addition, to cost more than $100,000 with equipment.

Elias Aircraft & Mfg. Corporation, Buffalo, recently organized by A. J. Elias, head of G. Elias & Brother, Inc., 965 Elk Street, manufacturer of wheels, propellers and other airplane parts, to take over and succeed last noted organization, has acquired 8-acre tract near municipal airport, and plans are under way for new plant, with initial capacity of 80 complete planes per month. Sherman S. Jewett, president, Jewett & Co., Inc., Military Road, manufacturer of stoves, etc., will be identified with new organization.

General Airplane Corporation, 550 Abbott Road, Buffalo, has acquired former local plant of Parenti Motor Co., 618 Northumberland Street, and will remodel for new plant and remove to new location. Additional equipment will be provided.

International Business Machines Corporation, Binghamton, N. Y., manufacturer of calculating and accounting machines and parts, has authorized plans for an addition to plant at Endicott, to cost more than $75,000 with equipment. A department will be established for production of new line of heavy duty scales.

Endicott Forging & Mfg. Co., Endicott, N. Y., has bought following new equipment: Hagan continuous heat treating and drawing furnace, Hagan car-type annealing furnace, Bliss No. 75½ press, 28-in. Ohio shaper, 4-ft. Bickford radial drill, 48 x 48-in. x 12-ft. Niles-Bement-Pond planer.

Ogden R. Adams has opened an office at 407 Cutler Building, Rochester, N. Y., for sale of machine tools.

Detroit

DETROIT, April 8.—Following recent organization of Ebel Hoist & Pump Co., Lansing, Mich., to take over and operate local plant and business of Lansing Motor & Pump Co., with capitalization of $75,000, plans are being considered for extensions to double capacity, to cost more than $30,000 with equipment. John Ebel is president.

Board of Water and Electric Light Commissioners, City Hall, Lansing, Mich., has plans for an addition to municipal electric light and power plant to cost over $300,000 with equipment. J. E. Woodwall, 501 Fifth Avenue, New York, is consulting engineer.

American Show Case Co., Adrian, Mich., will rebuild part of plant destroyed by fire April 4.

Federal-Mogul Corporation, 11031 Shoemaker Street, Detroit, manufacturer of bearings, bushings, die-castings, etc., has awarded general contract to Austin Co. for one-story foundry unit for die-casting to cost more than $50,000 with equipment.

Consumers Power Co., Jackson, Mich., has asked bids on general contract for new equipment storage and distributing plant, with service and repair divisions at Battle Creek, to cost over $200,000 with equipment. George F. Stecker is construction superintendent, with headquarters at Jackson.

Melling Forging Co., Lansing, Mich., manufacturer of iron and steel forgings, has purchased local plant and business of Reliance Engineering Co., manufacturer of kindred products, and will operate as branch plant and increase production.

City Council, Niles, Mich., has authorized purchase of 136-acre tract for municipal airport, and will have plans prepared for hangars, repair shops, and other units, project to cost more than $100,000.

Bohn Aluminum & Brass Corporation, Detroit, will start work immediately on an addition, 120 x 300 ft., to plant No. 5 at 7880 Joseph Campau Avenue, at cost of $250,000, of which $100,000 will be spent for equipment. Extension is to provide additional capacity for manufacture of aluminum extrusion for automobile body construction. Charles B. Bohn is president.

New England

BOSTON, April 8.—The past week witnessed quite a comeback in machine tool sales, despite the fact that dealers are handicapped by extended delivery dates. Recent purchases have been made by the General Electric Co., Lynn, Norton Co., Worcester, and manufacturers in Rhode Island, Connecticut and Springfield, Mass. At the present rate of buying April starts better than March, which was the largest month in the history of some houses.

There is a lively demand for used tools, but good machines are scarce.

The call for small tools continues in large volume, and the position of manufacturers regarding deliveries is much like that of large tool builders.

Thomas Fahey, 16 South Street, Marlboro, Mass., plans development of a sand pit at South Berlin, Mass. Bids are desired on air equipment and belting.

Winter Brothers Co., Kendrick Street, Wrentham, Mass., has started work on a one-story, 40 x 100 ft., machine shop addition. New metal working equipment will be installed.

Congdon & Carpenter Co., Providence, iron, steel and heavy hardware, has purchased 112,000 ft. on Promenade Street, on which a warehouse will be erected. Conveying equipment will be needed.

Frank Mossberg, Mossberg Pressed Steel Co., 81 West Street, Attleboro, Mass., is considering a one-story and basement manufacturing plant, 100 x 300 ft.

Vernon S. Vincellette, Fitchburg Enameling Co., Fitchburg, Mass., has purchased wooden ware plant of Frary Mfg. Co., Charlemont, Mass., and will install new wood-working tools, motors, and other equipment.

J. R. Worcester Co., 79 Milk Street, Boston, engineer, has plans for a one-story plant, 80 x 125 ft., for H. K. Porter, Inc., 6 Ashland Street, Everett, Mass., manufacturer of bolt cutters.

Olneyville Die Co., 40 Arnold Street, Providence, has started erection of a one-story plant, 44 x 106 and 43 x 63 ft.

Acorn Bearing Co., New Britain, Conn., ball bearings, will soon move to new one-story plant, 35 x 85 ft. Company is taking on new metal working equipment.

Contract has been let by Hartford Electric Light Co., 266 Pearl Street, Hartford, Conn., to Industrial Construction Co., 721 Main Street, for three-story equipment storage and distributing plant, 160 x 180 ft., with service and repair departments, to cost about $150,000 with machinery. Smith & Bassett, Hartford, are consulting engineers.

General Plate Co., Forest Street, Attleboro, Mass., manufacturer of jewelers' wire, tubing, etc., has begun construction of one and two-story addition, 50 x 74 ft., and 40 x 50 ft., to cost about $50,000 with equipment. Charles T. Main, 201 Devonshire Street, Boston, is architect and engineer. Rathbun Willard is general manager.

North Anson Mfg. Co., North Anson, Me., manufacturer of turned wood specialties, plans rebuilding part of plant destroyed by fire, April 1, with loss reported more than $150,000 with equipment. John P. Elton, Waterbury, Conn., is head.

Bay State Abrasive Products Co., Westboro, Mass., manufacturer of grinding materials, plans one-story plant to cost close to $40,000, with equipment. O. S. Buckman is head.

Hershey Metal Products Co., Derby, Conn., Kinne & Palmer, 256 Main Street, architects in charge, has asked bids on general contract for one-story plant, 65 x 100 ft., to cost about $45,000 with equipment.

Theodore E. Nordbeck, William H. Hoyt and Horace W. Jackson have organized Nordbeck-Hoyt & Jackson, Inc., 195 Albany Street, Cambridge, Mass., to act as factory d'stributer for Burham Boiler Corporation, maker of boilers, radiators and heating specialties.

Philadelphia

PHILADELPHIA, April 8.—Bids will be received by Department of Supplies, City Hall Annex, Philadelphia, Thomas F. Watson, director, until April 15, for combination punch and shear, air hammer, wheel tenoner and spoke driving machine, class 204; for induction motor, class 208; for structural steel stairways, class 203; metallic ring packing and pump valves, class 198; and for tool heates, trailer type, class 211.

Pennsylvania Railroad Co., Philadelphia, has awarded general contract to United Engineers & Constructors, Inc., 112 North Broad Street, for five-story power plant, to cost about $700,000 with equipment. Graham, Anderson, Probst & White, 80 East Jackson Boulevard, Chicago, are architects.

W. L. Charr, 1001 Chestnut Street, Philadelphia, architect, has filed plans for automobile service, repair and garage building, to cost about $140,000 with equipment.

Edgcomb Steel Co., Eleventh and Cambria Streets, Philadelphia, has awarded general contract to J. S. Rodgers Co., Drexel Building, for two-story storage and distributing plant, 156 x 250 ft., to cost about $200,000 with equipment. Clarence E. Wunder, 1520 Locust Street, is architect.

Warner Co., Wilmington, Del., has been formed to take over and consolidate Charles Warner Co., Wilmington, and Van Sciver Corporation, Twenty-fourth Street, Philadelphia, operating sand and gravel properties, and lime manufacturing plants. New company has arranged for bond issue of $7,000,000, part of proceeds to be used for expansion. Charles Warner is president.

Philadelphia Gas Works, 1401 Arch Street, Philadelphia, is said to be planning construction of power house, to cost over $40,000 with equipment.

Hopkins-Tull Machinery Co., Philadelphia, has been formed by Alfred Hopkins, George M. Robinson and associates, to take over and expand company of same name with plant at Seventh and Rockland Streets, including production of mechanical devices, metal products, etc., in addition to general machine equipment.

Trenton Potteries Co., North Clinton and Ott Streets, Trenton, N. J., manufacturer of sanitary ware, has engaged Lockwood Greene Engineers, Inc., 100 East Forty-second Street, New York, to prepare plans for five-story addition to cost about $500,000 with machinery.

Lehigh Portland Cement Co., Allentown, Pa., has authorized plans for extensions in mill at Sandt's Eddy, Pa., to cost more than $1,500,000 with machinery. It is proposed to double present capacity.

Consolidated School District of Solebury Township and New Hope Borough, New Hope, Pa., is considering installation of manual training equipment in new consolidated senior and junior high school to cost about $130,000. Franklin & Conver, 17 West Main Street, Lansdale, Pa., are architects.

Board of Trustees, Odd Fellows' Home of Pennsylvania, Middletown, will take bids at once for power plant at institution, to cost $100,000 with equipment. William H. Lee, 1505 Race Street, Philadelphia, is architect.

Kennedy Mfg. Co., Lutzville, Pa., recently formed by Robert R. Kennedy and Oscar Beegle, Lutzville, and associates, plans operation of local factory for production of plated ware, metal products, etc. Mr. Beegle will be treasurer.

Board of Trustees, Friends' High School, Moorestown, Pa., Chester L. Reagan, principal, has authorized installation of manual training equipment in new unit to cost $275,000, for which plans will soon be drawn.

South Atlantic

BALTIMORE, April 8.—International Harvester Co., 606 South Michigan Avenue, Chicago, motor truck division, plans early erection of two-story factory branch and distributing plant, with repair facilities at Raleigh, N. C., 80 x 180 ft., to cost more than $80,000 with equipment.

Peerless Fertilizer Co., Chestertown, Md., is said to be planning to rebuild part of mill destroyed by fire March 27, with loss more than $150,000 with machinery.

Board of Education, Municipal Office Building, Baltimore, plans installation of manual training equipment in new four-story junior high school on Harrington Road, to cost about $1,000,000. Smith & May, Calvert Building, are architects; Henry Adams, Calvert Building, is mechanical engineer.

Goodyear Tire & Rubber Co., Akron, Ohio, plans new mill at Rockmart, Ga., with machine shop, power house and other mechanical units, to cost about $3,500,000 with equipment. Project will include housing development for 400 operatives.

Chesapeake & Ohio Railroad Co., Richmond, Va., has awarded general contract to John W. Cowper Co., State Planters' Bank Building, for new engine house and repair shops at Clifton Forge, Va., to cost more than $200,000 with equipment. C. W. Johns is chief engineer.

Crozet Cold Storage Co., Crozet, Va., recently formed by John A. O'Neill and associates with capital of $300,000, has approved plans for new cold storage and refrigerating plant, to cost about $200,000 with machinery.

Reynolds Aviation Co. of North Carolina, Inc., Winston-Salem, George W. Orr, general manager, is planning construction of new hangars, repair and reconditioning shops, and other buildings at local municipal airport, to cost more than $85,000. Entire equipment will be removed from Curtiss Field, Long Island, to Winston-Salem, and additional facilities provided for increased operations.

Virginia Table Co., Marion, Va., is said to be planning construction of two new multi-story factory units, to cost more than $75,000 with equipment. Charles C. Lincoln is head.

Port Development Commission, Lexington Building, Baltimore, will soon begin construction of one-story shop, 35 x 84 ft., at foot of McComas Street, for storage and distributing unit, 35 x 106 ft., entire project to cost more than $80,000 with equipment. J. E. Greiner Co., address noted, is engineer.

American Oil Co., American Building, Baltimore, has plans for one-story oil storage and distributing plant at Allentown, Pa., to cost about $40,000 with equipment. T. J. O'Connell, address noted, is company engineer.

Crescent Air Service, Inc., Fox Building, Philadelphia, is said to be planning construction of hangars, repair and reconditioning shops and other buildings on 125-acre tract at Ten Mile municipal airport, Charleston, S. C., recently leased, to cost more than $90,000 with equipment.

Colonial Oil Co., Seaboard Bank Building, Norfolk, Va., is completing plans for new oil storage and distributing plant in Money Point district, to cost about $40,000 with equipment.

Cleveland

CLEVELAND, April 8.—While machine tool manufacturers and dealers did a good volume of business last week, sales were not as heavy as in the latter part of March. There were few orders for more than single machines and pending inquiries are not quite as plentiful as they have been.

Business is well distributed among various industries. While the automotive industry is still supplying the greater part, orders from that source are coming mostly from parts makers. New buying by automobile manufacturers in the Michigan territory is in less volume than recently.

Midland Engineering Co., Cleveland, has been organized by bondholders committee to operate plant of McMyler Interstate Co., Bedford, Ohio, recently purchased by bondholders. Committee consists of J. D. White, New York; R. L. Rice, Canton, Ohio; Samuel W. White, Chicago, and E. C. Delafield, New York. Personnel of new organization will be named shortly. Tractor cranes and other lines made by former company will be manufactured.

Hupp Motor Car Corporation has placed contract for one-story addition, 96 x 400 ft., to Hupp-Cleveland plant, Cleveland, to cost about $175,000.

Former plant of Marvel Equipment Co., Broadway and Pennsylvania Railroad, Cleveland, has been purchased by W. J. Schoenberger Co., which will remodel it to manufacture brass gas gages.

Cleveland Wheelbarrow & Mfg. Co. has purchased property of Bedford China Co., Bedford, Ohio, consisting of about six acres along Wheeling & Lake Erie Railroad and a one-story factory covering 45,000 ft. of floor space. Wheelbarrow company will remodel and occupy.

Factory Machine & Tool Corporation, Cleveland, was recently organized and has established plant at 6507 Cedar Avenue.

Aluminum Smelting & Refining Co., Cleveland, recently organized, has established plant at 1265 East Fifty-fifth Street. J. J. Ripner is president and L. J. Kane secretary and treasurer.

Clark Controller Co., 1146 East 152d Street, Cleveland, has let contract for an addition which will increase its capacity 50 per cent.

Spicer Mfg. Co., Toledo, Ohio, manufacturer of automobile axles, universal joints, etc., is said to be planning one-story addition, 100 x 500 ft., to cost over $350,000 with equipment.

Owens-Illinois Glass Co., Toledo, Ohio, has been organized to take over and consolidate Owens Bottle Co., with local plant, and ten other factories in different parts of country, and Illinois Glass Co., Alton, Ill., with eight plants in Central West and Western districts. Consolidated company plans expansion. W. H. Boshart, heretofore head of Owens company, will be president of consolidated organization; William E. Levis, previously president of Illinois company, will be first vice-president and general manager. A bond issue of $5,000,000 is planned.

Cleveland Heater Co., 1900 West 112th Street, Cleveland, manufacturer of automatic water heaters, parts, etc., has awarded general contract to Super-Built Construction Co., 1836 Euclid Avenue, for one-story addition, 75 x 100 ft., to cost about $50,000 with equipment. George

S. Rider Co., Century Building, is architect and engineer.

Electric Vacuum Cleaner Co., 1734 Ivanhoe Road, Cleveland, has filed plans for one-story addition, 80 x 125 ft., to cost about $30,000, for which general contract has been let to J. L. Hunting Co., Guarantee Title Building.

Milwaukee

MILWAUKEE, April 8.—There is no sign of any letup in demand for machine tools, despite the struggle to get deliveries. Buyers appear to be more or less reconciled with the situation and are anticipating future needs much further ahead than has been customary. Business continues to come from all lines of metalworking industry, and while single orders predominate, numerous round lots are reported. In some instances, bookings of tool builders require maximum capacity for five to six months.

Maynard Electric Steel Casting Co., 1336 Twenty-second Avenue, Milwaukee, has placed general contract with S. J. Wabiszewski, 880 Layton Boulevard, for a one-story foundry addition, 120 x 300 ft.

Wesley Steel Treating Co., 645-655 South Pierce Street, Milwaukee, which is building an addition, has increased its capital stock from $100,000 to $150,000 and will purchase two new car type furnaces, 6 x 13 ft., one gas-fired and one electrically heated, both with automatic control. Equipment will be ready June 1 and will double the present capacity.

Duluth, South Shore & Atlantic Railway, Duluth, Minn., is about to place contracts for new concrete and steel ore dock, costing about $2,000,000, at Marquette, Mich., to supplant present wooden dock. Work is to start by July 1.

Board of Vocational Education, Green Bay, Wis., has accepted bid of Mads Madsen Co., Minneapolis, on general contract for new manual arts institute, estimated to cost $[illegible]50,000.

George Banta Publishing Co., Menasha, Wis., has plans for a one-story extension, 90 x 150 ft., to accommodate machine shop, box factory and storage. Work will start about April 22.

Arnold Dryer Co., Galesville, Wis., has been incorporated by Gerald D. Arnold and Henry C. French of Galesville, and Guilford M. Wiley of La Crosse, Wis., to manufacture special machinery, tools and mechanical devices. Plant will be established in leased quarters at once.

Peerless Motors, Inc., 1615 Racine Street, Racine, Wis., will build a $20,000 addition to be equipped as a machine shop and service floor.

E. J. Longyear Co., Michigan and Walnut Streets, Marquette, Mich., manufacturer of diamond drills and other mining specialties, is building an addition to increase capacity about 50 per cent.

Pressed Steel Tank Co., Fifty-eighth and Greenfield Avenues, West Allis, Milwaukee, has acquired Seamless Steel Products Co., Twenty-seventh and Greves Streets, Milwaukee, and will operate as a subsidiary under name of Seamless Steel Products Corporation. Pressed Steel Tank Co. manufactures heavy steel containers and Seamless company light products, such as steel cans, gasoline tanks, fuel reservoirs for gasoline stoves, etc.

Gisholt Machine Co., Madison, Wis., announces direct sales representation in following territories: A. R. Engler, 5861 Upland Way, Philadelphia, in charge of Philadelphia district; Arnold S. Beckman, 850 Potomac Avenue, Buffalo, for Buffalo, Rochester and western New York, and T. G. LaManna, 6818 Washington Avenue, St. Louis, for St. Louis district.

The Crane Market

OVERHEAD crane inquiry is in good volume with a substantial number of orders not yet placed. The Board of Transportation, New York, has been obtaining estimates on a sizable list of monorail hoists for the new subway yards at 207th Street and Tenth Avenue and is expected to issue a formal call for bids on the list of cranes for these yards sometime this month. The New York Edison Co. is understood to have finally decided upon an overhead instead of a stationary locomotive crane for handling ashes at the Hell Gate power station and will probably place the order soon. Locomotive crane business is small with only a moderate volume of inquiry in the market. The Baltimore & Ohio Railroad is expected to close shortly on a 10 and a 15-ton crawl-tread crane.

Not many cranes are being awarded in the Pittsburgh district, but builders are engaged on old orders and quoting on a fair number of new inquiries. An upward revision in crane quotations is believed likely by sellers, as a result of the recent advance of from 12½ to 15 per cent in the prices of motors.

Among recent purchases are:

Chicago, Milwaukee, St. Paul & Pacific Railroad, two maintenance locomotive cranes from Orton Crane & Shovel Co.

Madison Construction Co., St. Louis, 12-ton, gasoline-operated crawl-tread crane from Orton Crane & Shovel Co.

Chicago

CHICAGO, April 8.—The first week in April shows little change in sales and inquiry from the rate maintained in March. There probably are fewer industrial lists than were before the trade two weeks ago, but requirements of a wide variety of users give promise of heavy sales in the immediate future. Demand for good used tools is urgent.

Prices are strong. One line of shapers has been raised 15 per cent and there is a general feeling that quotations on other lines of machine tools are about to advance. Electric motor manufacturers have advanced prices 10 to 15 per cent.

The old list of the International Harvester Co., Fort Wayne, Ind., is closed but it is said that a supplemental list will soon be issued. St. Paul railroad has closed for all but one or two items and is now asking for a 40-in. planer. Rock Island will buy a combination punch and shear and Chicago & North Western is in need of two 16-in. lathes. The Chicago Board of Education will buy seven motor-in-head lathes, two 18-in. band saws, a 1½-in. x 10-in. dry grinder and two 6-in. bench jointers.

W. A. Jones Foundry & Machine Co., 4401 West Roosevelt Road, Chicago, will build a one-story foundry addition, 130 x 100 ft., to cost $15,000. Weis & Niesteadt, 53 West Jackson Boulevard, are architects.

H. Kramer & Co., 2125 Loomis Street, Chicago, smelters, have purchased from Benjamin Harris & Co. plant which latter firm has occupied for fifteen years. Plans are being prepared for alterations and additions, to cost about $250,000, including equipment.

Johnson Machine Shop, Chariton, Iowa, will soon begin erection of two additions, one 50 x 132 ft. to be used as a machine shop, and the other, 45 x 130 ft., to serve as a storage room for heavy machinery.

Waterloo Steam Boiler Works, 110 Division Street, Waterloo, Iowa, plans to erect a new and larger shop within next few months. Upon completion company will begin production of automatic stokers, smokeless furnaces and sectional steel heating boilers.

Plans have been filed by Service Tool & Die Mfg. Co., 2256 Walnut Street, Chicago, for two-story plant, 100 x 108 ft., to cost about $40,000 with equipment. Olsen & Urbain, 228 North La Salle Street, are architects.

All-Steel Equipment Co., Griffith Avenue, Aurora, Ill., has superstructure nearing completion on one-story addition, and plans early installation of equipment, to cost about $30,000. Herbert E. Spieler, Graham Building, is architect.

Central Illinois Public Service Co., 130 South Sixth Street, Springfield, Ill., has plans for one-story equipment storage and distributing plant, including repair and service facilities, to cost about $60,000.

Chicago, Rock Island & Pacific Railroad Co., 149 West Jackson Boulevard, Chicago, is reported planning construction of new engine house and shops at yard at Des Moines, Iowa, to cost over $100,000 with equipment.

Colorado Interstate Gas Co., Colorado and Exposition Avenues, Denver, operating natural gas properties, is planning extensions in pipe lines and booster stations, Pueblo, Colo., to cost more than $500,000. Ford, Bacon & Davis, 39 Broadway, New York, are engineers.

General Mills, Inc., Minneapolis, Minn., has authorized construction of new grain elevator at Great Falls, Mont., with capacity of 1,250,000 bu., including elevating, conveying, screening and other equipment, to cost more than $400,000.

Board of Education, Des Moines,, Iowa, is said to be planning installation of manual training equipment in addition to North high school, to cost about $250,000, for which plans are being prepared by Wetherall & Harrison, Shops Building, architects.

Harry E. Silfen Co., Chicago, recently organized, has leased space in building at 429 West Superior Street, to manufacture wrought iron products.

City Council, Watertown, S. D., is arranging a bond issue of $150,000, fund to be used for installation of municipal electric light and power plant addition.

American Spiral Pipe Works, Chicago, has changed its name to Taylor Forge & Pipe Works.

Des Moines Steel Tank Co., Court Avenue and Nineteenth Street, Des Moines, has been purchased by C. E. Chapman, for past 14 years division sales manager for Columbian Steel Tank Co., Kansas City, Mo. John H. Albrecht, former owner, is organizing Des Moines Steel Building Co.

Pittsburgh

PITTSBURGH, April 8.—Machine tool business still is favorable, but in only a few instances have individual purchases run to more than one or two items. The Chesapeake & Ohio Railroad is reported to have placed some of the tools asked for in its recent inquiry.

Advances of from 12½ to 15 per cent have been announced by leading manufacturers in prices of all general-purpose motors up to about 250 hp. Larger sizes also have been advanced and it is understood that increases run somewhat heavier than in smaller motors.

Erie Bolt & Nut Co., Erie, Pa., is planning addition to Liberty Street plant.

Bids will soon be asked by Board of County Commissioners, City-County Building, Pittsburgh, for initial units of municipal airport at Mifflin Township, entire project to cost about $1,000,000. G. Brooks Ross, 519 Smithfield Street, is county airport engineer, in charge.

United Stainless Steel Corporation, Washington, Pa., has taken over local plant of Charcoal Iron Products Co., and will remodel for new works. Plans are under way for additional units, with installation of tinning equipment, electric furnaces and accessory apparatus.

Board of Public Education, Administration Building, Pittsburgh, will receive bids until April 16, for fans and motors, boilers, unit heaters, temperature regulating apparatus and auxiliary equipment.

American Sheet & Tin Plate Co., Frick Building, Pittsburgh, is planning for new one-story machine shop, and storage and distributing plant at Vandergrift, Pa., to cost over $125,000 with equipment. G. C. Kimball is company engineer.

Board of Education, Mount Pleasant, Pa., is considering installation of manual training equipment in new high school to cost about $160,000, for which bids have been asked on general contract. R. C. Howard, Deposit National Bank Building, Dubois, Pa., is architect.

M. K. Frank, Pittsburgh, dealer in scrap rails, will move on April 13 to 1204 Clark Building.

Cincinnati

CINCINNATI, April 8.—Machine tool buying has tapered off somewhat the past week, although sales still are of liberal volume. Orders continue to come from widely scattered sources, with the automobile industry contributing the most important bookings. However, purchases at Detroit are not so large as during the first three months of the year and are not likely to reach impressive proportions again until fall. Operations are being maintained at capacity in local shops, and the slowing down of demand is enabling some makers to cut down slightly delivery dates on certain types of tools.

The St. Paul Railroad has placed orders for several engine lathes, and the Louisville & Nashville has contracted for two engine lathes with local builders. Other carriers are expected to buy miscellaneous lots of tools in the next few weeks. A European automobile company is inquiring for a large number of special high production machines.

Firestone Tire & Rubber Co., Akron, Ohio, is considering new factory branch, storage and distributing plant at Cincinnati, to cost about $160,000 with equipment.

E. L. Hampton, Nichol Building, Nashville, Tenn., and associates have acquired a controlling interest in Cumberland Portland Cement Co., Cowan, Tenn., and will be active in management. It is proposed to carry out an expansion program.

Toccoa Electric Power Co., operated by Tennessee Electric Power Co., Chattanooga, Tenn., has authorized plans for hydroelectric power development on Toccoa River, near Blue Ridge, Ga., to develop 20,000 hp. capacity, to cost more than $2,500,000 with transmission system. Stevens & Wood, Inc., 120 Broadway, New York, is consulting engineer.

Linde Air Products Co., 30 East Forty-second Street, New York, manufacturer of industrial oxygen, etc., has awarded general contract to Platoff & Bush Co., 122 West Liberty Street, Louisville, for one-story branch plant at Louisville, to cost about $50,000 with equipment.

Columbia Gas & Electric Corporation, Cincinnati, has arranged for increase in capital from 4,000,000 to 10,000,000 shares of stock, no par value, part of fund to be used for expansion.

National Foundry Co., Bolander Avenue and line of Baltimore & Ohio Railway, Dayton, Ohio, has awarded general contract to A. W. Kimmel Co., Dayton, for one-story addition, to cost about $22,000 with equipment.

Kentucky - Tennessee Light & Power Co., Bowling Green, Ky., is planning to rebuild part of power plant at Beattyville, Ky., recently destroyed by fire.

Texas Corporation, Texas Building, Houston, Tex., and 17 Battery Place, New York, has acquired two-acre tract at Johnson City, Tenn., and plans new oil storage and distributing plant to cost about $50,000 with equipment.

St. Louis

ST. LOUIS, April 8.—Plans are under way by Broderick & Bascom Rope Co., 801 North Main Street, St. Louis, manufacturer of wire rope, cable, etc., for one-story addition, to cost about $125,000 with equipment. Larkin Engineering Co., 406 Market Street, is architect and engineer.

Cessna Aircraft Co., Wichita, Kan., has asked bids on general contract for new plant, including one-story units for parts production and assembling, to cost about $100,000 with equipment.

Mobile & Ohio Railroad Co., Fullerton Building, St. Louis, has awarded contract to Ellington-Miller Co., 25 East Jackson Boulevard, Chicago, for engine house and shops at Cahokia, Ill., including boiler unit, to cost $225,000 with equipment. B. W. Woods is chief engineer.

Liquid Carbonic Co., 1813 Olive Street, St. Louis, has awarded general contract to H. K. Ferguson Co., Cleveland, for two-story addition, 100 x 150 ft., to cost about $125,000 with equipment. Headquarters are at 3100 South Kedzie Avenue, Chicago. R. O. Chaffee, 3529 Franklin Avenue, St. Louis, is architect.

Nicholas-Beasley Co., Inc., Marshall, Mo., manufacturer of airplanes and parts, has plans for one-story unit, 50 x 150 ft., for assembling and other production, to cost about $80,000 with equipment. Saylor & Payson, Interstate Building, Kansas City, Mo., are architects.

Lion Oil Refining Co., Kansas City, Mo., is arranging bond issue to total $3,000,000, part of proceeds to be used for expansion and acquisition of other producing plants.

Johnson County Board of Education, Merriam, Kan., X. O. Meyer, treasurer, in charge, is planning installation of manual training equipment in three-story high school to cost $300,000, for which plans will soon be drawn.

R. W. Yates Laundry Machinery Supply Co., Tenth and Fayette Streets, North Kansas City, Mo., is considering a one-story addition, to cost over $40,000 with equipment.

South Side Machine Co., 4016 Nebraska Avenue, St. Louis, will soon begin superstructure for one-story machine works, 100 x 100 ft., to cost about $50,000 with equipment. Leonard Haeger, 3844 Utah Place, is architect. Henry Lindel is president.

Haggard Furniture Co., 322 West California Street, Oklahoma City, Okla., has plans for eight-story storage and distributing plant, 75 x 140 ft., with woodworking and finishing departments, to cost about $250,000 with equipment. Hawk & Parr, Cotton Exchange Building, are architects.

Robinson-Johnston Motor Co., Shawnee, Okla., has awarded general contract to G. P. Carr Construction Co., Shawnee, for service, repair and garage building, 140 x 190 ft., to cost about $100,000 with equipment.

Public Service Co. of Oklahoma, Tulsa, has plans for extensions in plants and system, transmission lines, etc., to cost more than $400,000.

Gulf States

BIRMINGHAM, April 8.—Contract has been let by Goodyear Tire & Rubber Co., Akron, Ohio, to A. K. Adams & Co., Inc., 542 Plum Street, N. W., Atlanta, Ga., for one, two and three-story rubber reclaiming mill at Gadsden, Ala., 60 x 100 ft., 40 x 100 ft., and 80 x 100 ft., to cost about $1,000,000 with machinery. Engineering department of company is in charge.

Board of Works, Houston, Tex., is considering rebuilding municipal fertilizer plant on ship channel, destroyed by fire March 28, with loss close to $75,000 with machinery. City engineering department, G. L. Fugate, principal assistant engineer, is in charge.

City Council, Pensacola, Fla., is planning construction of hangar, repair and reconditioning shop, and other units at Corry municipal airport, to cost about $60,000 with equipment.

Lamson & Sessions Bolt Co., 1971 West Fifty-eighth Street, Cleveland, will soon begin work on new plant at North Birmingham, for production of bolts, nuts, studs, rivets, etc., to cost about $400,000 with equipment. George S. Rider Co., Century Building, Cleveland, is architect and engineer.

Gulf Pipe Line Co., Fort Worth, Tex., operated by Gulf Oil Corporation, same address, has authorized extensions in pipe line in west Texas district, about 135 miles, with new pumping stations and other equipment to increase capacity about 50,000 bbl. per day, to cost more than $1,500,000. Headquarters of parent company are in Frick Building, Pittsburgh.

Southern Sugar Co., Clewiston, Fla., will carry out expansion program at local cane sugar refinery to increase capacity from 1500 to 4000 tons per day, including installation of nine sets of mill rolls and auxiliary equipment, to cost more than $500,000. Later it is proposed to build three more refineries in this vicinity. Company is affiliated with Celotex Co., 645 North Michigan Avenue, Chicago, manufacturer of insulating board, etc.; B. G. Dahlberg is head of both organizations.

Southwestern Transportation Co., operated by St. Louis & Southwestern Railway Co., Tyler, Tex., is said to be planning construction of engine and car repair shops at Texarkana, Tex., to cost over $175,000 with equipment.

Southwestern Gas & Electric Co., Shreveport, La., is planning extensions and improvements at Berryville, Ark., and vicinity, to cost about $125,000 with equipment.

Firestone Tire & Rubber Co., Akron, Ohio, has acquired property at Houston, Tex., as site for factory branch and distributing plant, to cost about $170,000 with equipment, for which plans will soon be ready for bids.

City Council, Shreveport, La., has authorized municipal airport, including hangars, repair shops and other buildings, to cost more than $100,000 with equipment.

Goulds Tire & Rubber Co., St. Petersburg, Fla., recently formed by Thomas C. Goulds and associates with capital of $500,000, has taken over plant at Tampashores, near St. Petersburg, heretofore used by Olds Motor Works, Lansing, Mich., totaling 50,000 sq. ft. floor space, and will equip to manufacture automobile tires and tubes. Project is reported to cost more than $250,000. Mr. Goulds is vice-president and general manager; Charles P. Bland is president.

Indiana

INDIANAPOLIS, April 8.—Indianapolis Power & Light Co., Indianapolis, will construct and operate new steam power plant near Sixteenth and Alabama Streets, to cost about $630,000 with equipment, including pipe lines for central steam heating service. Work will begin in May. E. G. Ralston is vice-president and chief engineer.

Evansville Malleable Castings Co., 2549 East Colm Street, Evansville, plans early call for bids for one-story foundry addition, to cost about $35,000 with equipment.

Morgan Packing Co., Austin, plans extensions in branch plant at Edinburg, Ind., formerly property of Edinburg Canning Co., recently acquired, including installation of automatic canning machinery, capping equipment, etc., to cost over $40,000.

Board of Trustees, Indiana Soldiers and Sailors Orphans' Home, Knightstown, Ind., L. A. Cortner, superintendent, has plans for new power house for central service, to cost $200,000 with equipment. McGuire & Shook, 941 North Meridian Street, Indianapolis, are architects.

Empire Oil & Refining Co., Tulsa, Okla., and 208 South La Salle Street, Chicago, has plans for new oil refinery at East Chicago, Ind., where 340-acre tract was recently secured, to cost about $10,000,000 with equipment and pipe line facilities.

Capehart Automatic Phonograph Co., 124 East Franklin Street, Fort Wayne, has awarded general contract to Rump-Kintz Co., Medical Arts Building, for one-story plant, to cost about $55,000 with equipment. C. W. Weatherhogg, 250 West Wayne Street, is architect.

Lever Brothers Co., Cambridge, Mass., manufacturer of soaps, etc., has acquired 18-acre tract at Hammond, Ind., as site for new plant, for which plans will be drawn soon, to cost about $4,000,000 with equipment.

Continental Steel Corporation, Kokomo, has superstructure under way for one-story addition, to cost about $300,000 with machinery.

Pacific Coast

SAN FRANCISCO, April 4.—Tract of 14½ acres in South Gate industrial district has been acquired by Pacific Star Roofing Co., Los Angeles, as site for new plant, to cost more than $75,000 with equipment.

Board of Regents, University of California, Berkeley, is having plans prepared for new power house on campus, to cost about $400,000 with equipment. George W. Kelham, 315 Montgomery Street, San Francisco, is architect and engineer.

Michel & Pfeffer Iron Works, Tenth and Harrison Streets, San Francisco, has plans for new plant on 5-acre tract at South San Francisco, to cost about $200,000 with equipment.

Western Enterprise Engine Co., 1000 Alhambra Avenue, Los Angeles, has awarded contract to Pacific Iron & Steel Co., 241 West Avenue 26, for one-story machine shop.

Gonzales School District, Gonzales, Cal., has plans for a one-story manual arts building, to cost about $35,000 with equipment. W. H. Weeks, Hunter-Dulin Building, San Francisco, is architect.

Fraser Gas Furnace Co., 445 South San Joaquin Street, Stockton, Cal., manufacturer of gas furnaces and kindred equipment, is having revised plans drawn for a one-story plant unit, totaling about 45,000 sq. ft. floor space, to cost about $65,000 with equipment. Ralph P. Morrell, Union Building, is architect.

Puget Sound Power & Light Co., Seattle, is planning new power switching station near Renton, Wash., to cost more than $600,000 with machinery.

San Joaquin Light & Power Co., Fresno, Cal., is planning expansion in Merced County, including extensions in power plant at Merced Falls, construction of steel tower transmission line and other work, to cost $700,000. A similar program will be carried out in Bakersfield, Cal., district, to cost more than $1,000,000 with equipment.

Ensign Carburetor Co., 217 East Seventeenth Street, Los Angeles, has filed plans for new one-story plant, 110 x 200 ft., and adjoining unit for experimental work, 40 x 60 ft., to cost about $50,000 with equipment. Hamm, Grant & Bruner, Inc., Ferguson Building, is architect.

Canada

TORONTO, April 8.—Machine tool demand still is in good volume, with builders reporting large bookings on hand. Distributers are figuring on several hundred dollars worth of equipment for the mining enterprises in northern Ontario, Quebec and Manitoba. Small tools are moving freely.

Canadian Ornamental Iron Works, 88 River Street, Toronto, Ont., has taken out permit for an addition to cost $10,000.

New United Canners, Consecon, Ont., have awarded contract to F. E. McMahon for an addition to cost $40,000.

Dominion Stove & Foundry Co., Penetanguishene, Ont., is having plans prepared for a $25,000 addition.

Ontario Refinery Co., Copper Cliff, Ont., proposes to build a copper refinery there.

Interior Hardware Co., Wilmot Street, Kitchener, Ont., has awarded contract to Casper Braun, Water and King Streets, for an addition to cost $20,000. Equipment will be purchased later. Charles Cowan, 100 Victoria Street, is architect.

Canadian Industrial Alcohol Co., Ltd., Lindsay, Ont., is having plans prepared for a plant to cost $200,000. T. Pringle & Son, Confederation Life Building, Toronto, are engineers.

Fairchild Aviation Co., Ltd., Grand 'Mere, Que., will build a local plant, and has also purchased a site at Longueuil, Que., for a plant to cost $500,000. Ellwood Wilson is president of company.

A. R. Gelinas, 1434 St. Catherine Street, West, Montreal, has been appointed agent by the American Hoist & Derrick Co., for Ontario, Quebec and the Maritime Provinces.

Foreign

ENGINEERING Department, City of Kishiwada, Japan, is securing fund of about 2,000,000 yen ($1,000,000), for port extensions and improvements. Mechanical handling equipment, including cranes, conveying machinery, loading equipment, trucks, etc., will be required. Information at office of Bureau of Foreign and Domestic Commerce, Washington, reference Japan No. 83801.

Chrysler Co. of Germany, Berlin, operated by Chrysler Corporation, Detroit, is planning expansion at automobile assembling works. Company has arranged to double capitalization to $25,000,000, a considerable part of fund to be used for work.

Council of City of Oslo, Norway, is considering construction of steam power plant at Filipstad, a suburb, for central power and heating service throughout city. Plant, with substations, is estimated to cost 30,000,000 crowns (about $7,600,000). Karl Ingero, director of municipal power bureau, is in charge.

Minister of Public Works, Madrid, Spain, has received authority to proceed with electrification of more than 1,000 miles of railroads, including divisions between Madrid and Avila, Madrid-Segovia-Medina, Valencia-Cuenca, and Catalonian system. Estimates of cost will soon be made and orders placed for equipment.

Educational Board, Government of Haiti, Port au Prince, has secured an appropriation of $600,000 for construction of 12 industrial schools in city, and $25,000 for a similar school at St. Marc. First noted group will each be equipped to provide for about 500 students. Information at office of Bureau of Foreign and Domestic Commerce, Washington, reference Haiti No. 301927, including name of purchasing agent for Haitian Government at New York.

Potash Trust of Soviet Russian Government, Moscow, plans construction of a milling plant, laboratory and electric generating station for development of potash mines in Solikamsk district. Amtorg Trading Corporation, 136 Broadway, New York, is official buying agency for Soviet Russian Union.